Title: Onset and evolution of millennial-scale variability of Asian monsoon and its possible relation with Himalaya and Tibetan uplift

Proponent(s): Ryuji Tada, Takuya Itaki, Youbin Sun, Ken Ikehara, Takeshi Nakajima, Jang Jun Bahk, Sang Hoon Lee, Hongbo Zheng, Sergey Gorbarenko

Keywords: Millennial-scale variability, East Asian monsoon, westerly jet, Tectonics-climate linkage, land-ocean linkage

Area: The Japan Sea, East China Sea

Contact Information:
Contact Person: Ryuji Tada
Department: Department of Earth and Planetary Science
Organization: Graduate School of Science, University of Tokyo
Address: 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-0003, Japan
Tel.: +81 3 5841-4523 Fax: +81 3 5841 8318
E-mail: ryuji@eps.s.u-tokyo.ac.jp

Permission to post abstract on IODP-MI Sapporo Web site: Yes

Abstract: (400 words or less)

It is well demonstrated that Asian monsoon varied with the Dansgaard-Oeschger Cycles [DOC]. Recent studies further suggest that such variability may have been caused by oscillations in westerly jet circulation between two different modes of meandering. Because topographic effect of Himalaya and Tibetan Plateau [HTP] is considered as the probable cause of different modes of the westerly jet meandering, and increasing evidences suggest final uplift of HTP commenced during Plio-Pleistocene, it is hypothesized that Plio-Pleistocene uplift of HTP, and consequent emergence of the two discrete modes of westerly jet meandering is the cause of the millennial-scale variability of the Asian monsoon and amplification of the DOC.

In this project, we aim to collect the geological evidence necessary to test this hypothesis through drilling in the Japan Sea and northern part of the East China Sea. We propose to drill two latitudinal transects in the Japan Sea to monitor the behaviors of the westerly jet and winter monsoon. We also propose to drill at the northern part of the East China Sea to monitor the Yangtze River discharge history that should have been reflecting variations in summer monsoon intensity. The southern transect will be used to reconstruct the behavior of the subpolar front and examine its relationship with the westerly jet and the sea level changes. Whereas the northern transect will be used to identify ice-rafted debris [IRD] events and reconstruct temporal variation in its southern limit, which we consider as winter monsoon proxies. Finally, we arrange two depth transects to reconstruct the ventilation history of the sea. We will examine the relation between the ventilation in the sea, and the nature of the influx through the Tsushima Strait and/or winter cooling.

Through the proposed drilling, we hope to 1) specify the onset timing of orbital and millennial-scale variabilities of East Asian monsoon and westerly jet, and reconstruct their evolution process and spatial variation patterns, and 2) reconstruct orbital and millennial-scale paleoceanographic changes in the Japan Sea during the last 5 m.y. to clarify the linkage between the paleoceanographic changes in the Japan Sea and variabilities of East Asian monsoon and/or sea level changes. Comparison of the obtained results with the uplift history of HTP will enable us to test the idea that topographic evolution of HTP was responsible for creation of bimodality in westerly jet circulation that caused amplification of millennial-scale variability of Asian monsoon.
We hypothesize that there have been two quasi-stable modes of the westerly jet meandering, and oscillation between the two modes could be the essential part of the Dansgaard-Oeschger Cycles. We further speculate that Himalaya-Tibetan Plateau [HTP] play a role of topographic barrier that creates the two quasi-stable modes of the westerly jet meandering and Plio-Pleistocene uplift of HTP could have triggered the onset of millennial-scale abrupt climatic changes in northern hemisphere. In this proposal, we plan to collect paleoclimatological and paleoceanographical constraints critical to test this hypothesis through IODP drilling of the Japan Sea and northern part of the East China Sea. The drilling will enable us to reconstruct the history of onset and evolution of the orbital and millennial-scale variabilities of summer monsoon, winter monsoon, westerly jet position and intensity, and desertification in East and Central Asia during the last 5 m.y. We also propose to explore the linkage between orbital and millennial-scale variabilities of the East Asian monsoon, discharge of the Yangtze and Yellow Rivers, and paleoceanography in the Japan Sea.

Aims of the proposed drilling are two folds.
1) Specify the onset timing and reconstruct evolution process of orbital and millennial-scale variabilities of East Asian monsoon (summer monsoon, winter monsoon, and westerly jet axis), reconstruct their spatial patterns, and examine their interrelationship.
2) Reconstruct orbital- and millennial-scale changes in surface- and deep-water circulations in the Japan Sea, and examine their relation with variabilities of East Asian monsoon and glacio-eustatic sea level changes.

Please describe below any non-standard measurements technology needed to achieve the proposed scientific objectives.
None

Proposed Sites:

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Position</th>
<th>Water Depth (m)</th>
<th>Penetration (m)</th>
<th>Brief Site-specific Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sed</td>
<td>Bsm</td>
</tr>
<tr>
<td>JS-1</td>
<td>37°02'N 134°48'E</td>
<td>930</td>
<td>400</td>
<td>0</td>
</tr>
<tr>
<td>JS-3</td>
<td>40°07'N 134°00'E</td>
<td>1150</td>
<td>250</td>
<td>0</td>
</tr>
<tr>
<td>JS-4</td>
<td>41°42'N 139°05'E</td>
<td>1785</td>
<td>250</td>
<td>0</td>
</tr>
<tr>
<td>JS-5B</td>
<td>43°46'N 138°50'E</td>
<td>3435</td>
<td>200</td>
<td>0</td>
</tr>
<tr>
<td>JS-7B</td>
<td>40°11'N 138°14'E</td>
<td>2811</td>
<td>150</td>
<td>0</td>
</tr>
<tr>
<td>JS-9</td>
<td>38°37'N 134°32'E</td>
<td>2874</td>
<td>200</td>
<td>0</td>
</tr>
<tr>
<td>JS-10B</td>
<td>35°576'N 134°26'E</td>
<td>316</td>
<td>500</td>
<td>0</td>
</tr>
<tr>
<td>JS-11</td>
<td>37°31'N 130°20'E</td>
<td>1620</td>
<td>250</td>
<td>0</td>
</tr>
<tr>
<td>ECS-1</td>
<td>31°38'N 128°57'E</td>
<td>746</td>
<td>500</td>
<td>0</td>
</tr>
</tbody>
</table>
Onset and evolution of millennial-scale variability of Asian monsoon
and its possible relation with Himalaya and Tibetan Plateau uplift

Ryuji Tada, Takuya Itaki, Youbin Sun
Department of Earth and Planetary Science, University of Tokyo, 7-3-1 Hongo, Tokyo 113-0033, Japan

Ken Ikehara, Takeshi Nakajima
National Institute of Advanced Industrial Science and Technology, 1-1-1 Higashi, Tsukuba,
Ibaraki 305-8567, Japan

Jang Jun Bahk
Petroleum and Marin Resources Div., Korea Institute of Geoscience and Mineral Resources,
Gajeong-dong 30, Yuseong-gu, Daejeon 305-350, Korea

Sang Hoon Lee
Challenger Division, Southampton Oceanography Centre, European Way, Southampton SO14
3ZH, UK

Hongbo Zheng
School of Ocean and Earth Science, Tongji University, Shanghai, China

Sergey Gorbarenko
V.I. Il'ichev Pacific oceanological Institute, Baltjiskaya Str. 43, Vladivostok, 690041,
Russia
ABSTRACTS:

It is well demonstrated that Asian monsoon varied in association with the Dansgaard-Oeschger Cycles [DOC]. Recent studies further suggest that such millennial-scale monsoon variability may have been caused by oscillations in westerly jet circulation patterns between two different modes of meandering. Because topographic effect of Himalaya and Tibetan Plateau [HTP] is considered as the probable cause of two different modes of the westerly jet meandering, and increasing evidences suggest final uplift of Himalaya and northern Tibet commenced during Plio-Pleistocene, it is hypothesized that Plio-Pleistocene uplift of Himalaya and northern Tibet, and consequent emergence of the two discrete modes of westerly jet meandering is the cause of the millennial-scale variability of the Asian monsoon and possibly amplification of the DOC.

In this project, we aim to collect the geological evidence necessary to test this hypothesis through drilling in the Japan Sea and northeastern part of the East China Sea. To accomplish this aim, we propose to drill two latitudinal transects in the Japan Sea to monitor the behaviors of the westerly jet and winter monsoon. We also propose to drill at the northern part of the East China Sea to monitor the Yangtze River discharge history that should have been reflecting variations in the summer monsoon intensity. The southern latitudinal transect will be also used to reconstruct the behavior of the subpolar front and examine its relationship with the westerly jet as well as the glacio-eustatic sea level changes. Whereas the northern latitudinal transect will be also used to identify ice-rafted debris [IRD] events and reconstruct temporal variation in its southern limit, which we consider as reflecting the intensity of winter monsoon. Finally, we arrange 4 sites to form two depth transects in the northern and southern parts of the Japan Sea to reconstruct the ventilation history of the sea. We will examine the relation between the ventilation in the Japan Sea, and the nature of the influx through the Tsushima Strait and/or winter cooling, the latter reflects the intensity of winter monsoon.
Through the proposed drilling, we hope to 1) specify the onset timing of orbital and millennial-scale variabilities of East Asian monsoon and westerly jet, and reconstruct their evolution process and spatial variation patterns, and 2) reconstruct orbital and millennial-scale paleoceanographic changes in the Japan Sea during the last 5 m.y. to clarify the linkage between the paleoceanographic changes in the Japan Sea and variabilities of East Asian monsoon and/or glacio-eustatic sea level changes. Comparison of the obtained results with the uplift history of HTP during Plio-Pleistocene will enable us to test the idea that topographic evolution of the HTP was responsible for creation of bimodality in westerly jet circulation that caused amplification of millennial-scale variability of Asian monsoon.

1. INTRODUCTION (SCIENTIFIC BACK GROUNDS)

1.1 Onset and evolution of millennial-scale variability of Asian monsoon and its possible linkage with uplift of Himalaya-Tibetan Plateau [HTP]:

Millennial-scale climatic variability, best known as the Dansgaard-Oeschger Cycles [DOC], is at least a hemispheric phenomenon in the northern hemisphere and characterized by complex interactions among atmosphere, ocean, cryosphere, and biosphere (e.g., Bond et al., 1993; Broecker et al., 1990). However, spatial variation pattern, operation mechanism, and ultimate cause of the DOC are still not well understood. Recent studies demonstrated that East Asian and Indian summer monsoon varied significantly in association with the DOC (Schulz et al., 1998; Tada et al., 1999; Wang et al., 2001, Tada, 2004). It is also demonstrated that climate and oceanography in western Mediterranean Sea and surrounding area varied in association with the DOC with the variation characterized by the northward shift and intensification of the westerlies during the DO stadials (Moreno et al., 2002; Casho et al., 2002; Sanchez Goni et al., 2002).

Recently, Nagashima (2005) found that the westerly jet over the Japan Sea also shifted in N-S direction in association with the DOC with southward shift during the DO stadials.
Together with western Mediterranean result described above, it suggests that the DOC should be characterized with the shift in the westerly jet circulation mode in the northern mid-latitude (Figure 1). Since the inferred movement of the westerly jet axis is opposite between Mediterranean Sea and the Japan Sea, the shift was more likely characterized by different degree of meandering rather than a simple N-S shift. Ono et al. (1998) suggested that westerly jet flowed along the southern side of Himalaya during MIS 2 based on eolian quartz provenance in East Asia inferred from its electron spin resonance [ESR] signal intensity. If correct, topographic effect of HTP could be critical for causing meandering of the westerly jet and its shift in association with the DOC. It is even possible that HTP uplift could have created multiple stable modes of westerly jet meandering and triggered the onset of DOC-type climatic variability (Tada, 2004).

According to the study of ice-rafted debris [IRD] in North Atlantic, millennial-scale IRD events are recognized at least since 1.4 Ma (Jansen et al., 2000; Raymo et al., 1998) and could be as old as 1.93 Ma (McIntyre et al., 2001). However, it is not well constrained when such millennial-scale variability started, how it evolved through time, and what is its relationship with the onset and evolution of the orbital-scale variability. On the other hand, results of previous studies tend to suggest that HTP uplift started approximately at 25 Ma and reached to more or less the present height by 5 Ma (e.g., Copeland, 1997). However, recent studies in inland Asia demonstrated that uplift of northern Tibet started around 3.6 Ma (Zheng et al., 2000; Li et al., 1997), and uplift of Himalaya restarted during late Pliocene to Pleistocene and continued till present (Jain, et al., 2000; Sakai, 2002; Vance, et al., 2003; Wobus, et al., 2003). Since uplift of these areas should have enhanced the extent and altitude of topographic barrier against the westerly jet, it is possible that the course and intensity of the westerly jet were also influenced significantly (Rea et al., 1998). Thus, results of recent paleoclimatic and tectonic studies seem concordant with the idea that HTP uplift amplified the DOC type millennial-scale variability of westerly jet circulation through the topographic effect.
Recent climatic model simulation studies, which evaluate the impact of HTP uplift on the onset and evolution of Asian monsoon and its variability, demonstrate that desertification in inland Asia, East Asian summer and winter monsoons, and their orbital-scale variability have not necessarily been started and evolved simultaneously (An et al., 2001; Liu and Yin, 2002). Namely, Indian and East Asian summer monsoon intensified exceeding present level during relatively early stage of the uplift and their intensities slightly decreased during the later stage. Whereas East Asian winter monsoon intensified only after approximately 50% of the present height of Tibet was attained. Temporal variation of the summer and winter monsoon proxies in Chinese loess seems consistent with these climatic simulation results (An et al., 2001). Namely, the summer monsoon intensity increased from 3.6 to 2.6 Ma, thereafter the overall intensity slightly decreased. The winter monsoon intensity also increased from 3.6 Ma and continued to increase after 2.6 Ma. In addition, the behavior of westerlies and its relation with East Asian monsoon during the last 2.6 Ma has been discussed on the basis of grain size of Chinese loess (Sun et al., 2003). However, the relation between westerlies and the East Asian monsoon before 2.6 Ma, as well as the onset timing and evolution process of millennial-scale variability of East Asian summer and winter monsoons have never been explored. Also previous climatic models never evaluated the topographic effect of final uplift of Himalaya and northern Tibet on the behavior of westerlies.

1.2 Land-ocean linkage through monsoon variability in East Asian continental margin:

With increasing awareness of the human impact on our environment, public pays more attention to the impact of discharge from large rivers on the environment of continental margin and marginal seas as well as the impact of the consequent oceanographic changes on the terrestrial climate. For example, the impact of the construction of the Three Gorge Dam and consequent decrease in Yangtze River discharge on the oceanographic conditions in the East China Sea and the Japan Sea, and climate in their surrounding area has been cautioned (e.g., Chen, 2002).
It is well demonstrated that East Asian summer monsoon intensity varied significantly in orbital and millennial scales (Tada et al., 1999; Wang et al., 2001; Tada, 2004), which should have caused significant variation in the discharges from Yangtze and Yellow Rivers. Tada et al. (1999) speculated that such variation in Yangtze River discharge could have been responsible for the drastic changes in paleoceanography of the Japan Sea, leading to deposition of distinct alternations of the org-C rich dark laminated layers and org-C lean light bioturbated layers. However, this idea has never been tested vigorously and the process(es) and mechanism(s) linking the East Asian summer monsoon, Yangtze River discharge, and the Japan Sea paleoceanography are still not fully understand in spite of their importance to evaluate the ongoing and near future changes in the oceanography of the Japan Sea and East China Sea as well as climate in the surrounding land area.

2. PRESENT OCEANOGRAPHY OF THE JAPAN SEA

The Japan Sea is a semi-enclosed marginal sea with the area of approximately 1 x 10^6 km^2 and the average depth of 1350 m. The sea consists of three major basins, the Japan Basin to the north, the Yamato Basin to the southeast, and the Tsushima (Ulleung) Basin to the southwest, which are divided by the Yamato Rise (Figure 2). The Japan Sea is connected with other seas by shallow and narrow straits, namely, the East China Sea to the south through the Tsushima Strait (130 m), the North Pacific to the east through the Tsugaru Strait (130 m), and the Okhotsk Sea to the north through the Soya (55 m) and Mamiya (20 m) Straits, respectively (Figure 2).

At present, the Tsushima Warm Current [TWC], a branch of Kuroshio Current, is the only current flowing into the Japan Sea. After entering into the sea, the TWC is divided into three branches (Figure 2). The first and second branches flow northeastward on the inner and outer shelf along the western margin of Honshu Island. Whereas the third branch flows
northward along the eastern margin of Korean Peninsula to ca. 38°N, where it deflects eastward to cross the central part of the Japan Sea forming the subpolar front, and merges with the first and second branches at ca. 40°N in the western margin of the Honshu Island. Majority of the TWC flows out through the Tsugaru Strait whereas the rest flows further north along the western margin of Hokkaido Island and flows out through the Soya Strait into the Okhotsk Sea. As a result, the TWC carries the heat as far north as 45°N compared with the Kuroshio Current that penetrates only to 38°N, and gives a significant influence on the climate not only in Honshu and Hokkaido but further north in the southern part of Sakhalin.

In the East China Sea, the Taiwan Warm Current, a branch of Kuroshio Current, mixed with Changjiang (=Yangtze) River Diluted Water to form the TWC (Ichikawa and Beardsley, 2002), and over 70% of the fresh water discharged from the Yangtze River is carried into the Japan Sea with the TWC. As a result, salinity of the surface water in the Japan Sea is strongly influenced by the freshwater discharge from the Yangtze River. Since East Asian summer monsoon supplies a large amount of freshwater to the catchment area of the Yangtze River, it is conceivable that East Asian summer monsoon influences the surface water condition of the Japan Sea through the TWC.

The Japan Sea has its own deep water called the Japan Sea Proper Water [JSPW]. The JSPW is present below the depth of ca. 300 m and is characterized by nearly constant salinity of 34.06 to 34.08 permil, rather cold temperatures of 0.0 to 0.6 °C, and high dissolved oxygen concentration of 5 to 7 ml/l (Sudo, 1986). This high oxygenation level reflects vigorous ventilation of the deep water with residence time of a few hundred years (e.g., Gamo and Horibe, 1983; Harada and Tsunogai, 1986; Watanabe et al., 1991, Tsunogai et al., 1993). The JSPW is formed in the northwestern part of the sea as a result of severe winter cooling and consequent formation of sea ice (Talley et al., 2003). Consequently, deepwater ventilation could have been influenced by the winter monsoon intensity (Gamo, 1999). It is also pointed out that production of JSPW is roughly balanced with inflow of the TWC during
winter (Yanagi, 2002), suggesting a possible linkage between the influx of the TWC and ventilation in the deeper part of the Japan Sea. Recent measurement of dissolved oxygen concentration of the deepwater in the Japan Sea revealed significant reduction in ventilation below 1500 m water depth during the last 70 years (Gamo, 1999). It is suggested that dissolved oxygen below 1500 m will be eliminated within 300 years if this situation continues, and that global warming and subsequent weakening of winter monsoon could be responsible (Gamo, 1999).

At present, significant amount of eolian dust falls over the Japan Sea especially during early spring. Recent sediment trap study estimates annual eolian dust flux of 45 g/m²/y in the western Japan Basin and 23 g/m²/y in the Yamato Basin (Otosaka et al., 2004). These values are comparable to average mass accumulation of Quaternary sediments of 41 g/m²/y at ODP Site 797 (Irino and Tada, 2000), suggesting significant contribution of eolian dust to the Quaternary hemipelagic sediments of the Japan Sea.

3. SCIENTIFIC OBJECTIVES

Based on the scientific background described above, we hypothesize that there have been two quasi-stable modes of the westerly jet meandering, and oscillation between the two modes could be the essential part of the DOC. We further speculate that HTP play a role of topographic barrier that creates the two quasi-stable modes of the westerly jet meandering and Plio-Pleistocene uplift of HTP could have triggered the onset of millennial-scale abrupt climatic changes in northern hemisphere.

In this proposal, we plan to collect paleoclimatological and paleoceanographical constraints critical to test this hypothesis through IODP drilling of the Japan Sea and northern part of the East China Sea. The drilling will enable us to reconstruct the history of onset and evolution of the orbital and millennial-scale variabilities of summer monsoon, winter monsoon, westerly jet position and intensity, and desertification in East and Central Asia during the last
during the last 5 m.y. We also propose to explore the linkage between orbital and millennial-scale variabilities of the East Asian monsoon, discharge of the Yangtze and Yellow Rivers, and paleoceanography in the Japan Sea.

Aims of the proposed drilling are two folds.

1) Specify the onset timing and reconstruct evolution process of orbital and millennial-scale variabilities of East Asian monsoon (summer monsoon, winter monsoon, and westerly jet axes), reconstruct their spatial patterns, and examine their interrelationship.

2) Reconstruct orbital- and millennial-scale changes in surface- and deep-water circulations in the Japan Sea, and examine their relation with variabilities of East Asian monsoon and glacio-eustatic sea level changes.

4. DETAILS OF THE OBJECTIVES AND STRATEGIES

4.1 Onset timing of millennial-scale variability of East Asian monsoon, and their evolution process and spatial variation patterns:

Elucidation of the process and mechanism of the millennial-scale abrupt climatic changes (=DOC) is one of the most important subjects in Initial Science Plan [ISP]. However, the temporal and spatial variation patterns, operation mechanism, and ultimate cause of the DOC are still not well understood. We believe it to be crucial to specify the onset timing and reconstruct the evolutionary process of the DOC within the temporal and spatial context in order to solve these problems. Recent high-resolution paleoclimate/paleoceanography studies suggest that Asian monsoon and westerly jet circulation play a critical role in operation and propagation of the DOC (Schulz et al., 1998; Tada et al., 1999; Wang et al., 2001; Moreno et al., 2002; Tada, 2004). If correct, specification of the onset timing and reconstruction of the evolutionary process of the millennial-scale variability of the East Asian monsoon in temporal and spatial framework will provide critical information to solve these problems.
In this project, we plan to specify the onset timing and reconstruct evolution of orbital to millennial-scale variabilities based on the following approaches.

a) The axial position and intensity of the westerly jet and southern limit of East Asian winter monsoon: We plan to reconstruct the axial position and intensity of the westerly jet and southern limit of East Asian winter monsoon through examination and comparison of the eolian dust provenance and grain size along two latitudinal transects (JS-1, 9, 3, and 7B, 4, 5B) plus one additional site (JS-11) in the south western part of the Japan Sea. Eolian dust grain size and flux are considered as useful parameters to evaluate the intensity of transport wind and aridity of source areas (e.g., Rea et al, 1985), and reconstruction of the westerly jet axis position will be possible through examination of eolian dust grain size variation along the N-S transect (e.g., Rea and Leinen, 1988). Nagashima (2005) examined provenance of quartz in the late Quaternary hemipelagic sediments of the Japan Sea at the sites close from JS-1 and 7B using ESR signal intensity and crystallinity of quartz. She found that detrital quartz in the hemipelagic sediments of the Japan Sea is a mixture of three components, quartz from Siberia-Northeastern China, Taklimakan-Loess Plateau, and Japanese Arc, respectivelly (Figure 3). She also demonstrated that detrital quartz in the silt fraction is dominantly composed of eolian dust from Siberia-Northeastern China and Taklimakan-Loess Plateau areas whereas that in clay fraction is a mixture of eolian quartz and detrital quartz derived from the Japan Arc based on ESR signal intensity and crystallinity measurements of quartz in clay and silt fractions. Based on this observation, she reconstructed temporal variations in eolian dust grain size (median grain size of detrital silt fraction) and relative contribution of eolian dust from Siberia-Northeastern China and Taklimakan-Loess Plateau areas to the hemipelagic sediments at JS-1 as well as N-S gradient of eolian dust grain size between the two sites during the last 150 kys (Figure 4). Theresults suggest that eolian dust grain size, its N-S gradient, and eolian dust provenance varied in harmony with insolation at 30°N in June and also with the DOC. She interpreted variations in these parameters to reflect N-S
oscillations in westerly jet axis and associated N-S migrations in southern limit of winter monsoon. Application of end-member modeling approach (e.g., Prins et al., 2000) to the grain size distribution data combined with eolian dust provenance data will further improve our estimation of the relative contribution and grain size distribution of eolian dust from two different sources as well as detrital particles delivered from rivers and transported by suspension in the surface water.

b) Winter monsoon intensity: We plan to reconstruct the winter monsoon intensity through examination of IRD abundance and distribution along the northern latitudinal transect (JS-7B, 4, 5B) in the Japan Sea. At present, stronger winter monsoon wind produces deep water through sea ice formation in the northwestern part of the Japan Sea (Talley et al., 2003). Consequently, sea ice formation and deepwater ventilation could reflect winter monsoon intensity. Ikehara (2003) described the occurrence of millennial-scale IRD events in the northern part of the Japan Sea during the last 160 kys. Correlation of his IRD data with lightness (L*) profile of MD01-2407 suggests that many of these IRD events coincide with the intervals of high L* values suggesting intense deepwater ventilation that in turn coincide with Heinrich events (Figure 5). Grain size studies of loess-paleosol sequence in China also suggest intensification of winter monsoon during Heinrich events (e.g., Porter and An, 1995). Thus, IRD and L* of the sediments could be good indicators of the winter monsoon intensity.

c) Summer monsoon intensity: We also plan to reconstruct variation in the summer monsoon intensity through examination of surface water temperature and salinity changes, and variation in chemistry, mineralogy, and mass accumulation rate of the fine-grained terrigenous sediments delivered from the Yangtze River at the northeastern margin of the East China Sea (ECS-1). Ijiri et al. (2005) reported occurrence of light $\delta^{18}O$ spikes of planktonic foraminifer Globigerinoides ruber, which seem to correspond to interstadials of the DOC. They interpret these spikes as reflecting low salinity events caused by increased discharge from Yangtze and Yellow rivers and subsequent expansion of East China Sea Coastal Water [ECSCW] because no change in alkenone temperature is observed during
[ECSCW] because no changes in alkenone temperature is observed during these events. It is possible to estimate salinity changes associated with these events more precisely by combining δ¹⁸O with Mg/Ca measurement. Recent geochemical studies of ODP Site 1145 in northern South China Sea, on the other hand, demonstrated usefulness of K/Al and Ba/Si ratios as proxy indicators for summer and winter monsoon intensities, respectively (Wehausen and Brumsack, 2002). Although its application to the East China Sea sediments has never been conducted before, we believe it to be applicable to the sediments of the East China Sea.

The obtained results will be compared one another to examine the interrelationship among the summer monsoon, winter monsoon, and westerly jet axis movement with respect to the onset timing and evolutionary processes. We will further compare the result with the IRD records from the northwestern Atlantic (result from North Atlantic I and II) and Okhotsk Sea to examine when the millennial-scale climatic linkage between North Atlantic and East Asia started and how it evolved.

4.2 Response of the Japan Sea paleoceanography to orbital and millennial-scale variabilities of East Asian monsoon and glacio-eustatic sea level changes:

As has been described above, oceanography of the Japan Sea is very sensitive to the nature and amount of the influx through the Tsushima Strait, which is influenced by Asian monsoon. It has been well documented that Quaternary hemipelagic sediments of the Japan Sea are characterized by cm to decimeter scale alternations of org-C rich dark and org-C lean light layers (e.g., Tada et al., 1992). Later, Tada et al. (1995, 1999) suggested that these alternations are associated with the DOC. Our recent ¹⁴C dating of the core from the site close to JS-1 further confirm a tight tele-connection between the DOC and deposition of the dark and light layers which are synchronous within uncertainty of ¹⁴C dating (Figure 6).

Based on the increase in relative abundance of *Paralia sulcata*, a sublittoral diatom species characteristic of ECSCW, in these dark layers, Tada et al. (1999) argued that deposition of these dark layers was resulted from the increasing contribution of low salinity
and nutrient-rich ECSCW to the TWC and consequent increase in surface productivity and reduction in vertical mixing. They further argued that the increase in relative contribution of the ECSCW to the TWC could have been caused by increased discharge from the Yangtze and Yellow Rivers in response to intensified summer monsoon. This interpretation is consistent with the recent studies by Ijiri et al. (2005) as described above, and Wang et al. (2001) who proposed summer monsoon intensification during the DOC interstadials based on high-resolution δ18O analysis of a stalagmite in Hulu Cave (Figures 1 and 5).

In present East China Sea, phosphorous (a major nutrient that limits organic carbon burial in longer time scales) is mainly supplied through upwelling of the subsurface Kuroshio water to the edge of the East China Sea shelf, and the upwelling is basically induced by outflow of the low salinity water from the shelf area (Chen et al., 1999). Consequently, the increase in freshwater discharge from the Yangtze River enhances nutrient supply to the East China Sea through enhancement of upwelling of the nutrient-rich subsurface Kuroshio water. Majority of the nutrients supplied to the shelf is transported into the Japan Sea with the TWC. Since nutrient supply to the Japan Sea is dominantly carried by the TWC, it is reasonable to consider that surface productivity in the Japan Sea is controlled by the nutrient flux through the Tsushima Strait especially in time scales longer than 100 yrs (Figure 7). In this way, variation in the summer monsoon intensity is considered to have been recorded as variations in organic phosphorous and carbon burial rate in the Japan Sea.

On the other hand, glacio-eustatic sea level changes have profound influence on the paleoceanographic condition of the Japan Sea in orbital to m.y. time scales. For example, the sill depth of the sea became shallower than 20 m and the surface water salinity decreased drastically as a result of increasing contribution of the freshwater input from the surrounding rivers relative to the sea water influx through the Tsuhsima Strait during the last glacial maximum [LGM] (Oba et al., 1991, 1995). The low salinity surface water strengthened density stratification, causing euxinic deepwater condition similar to the present Black Sea,
and resulted in deposition of a finely-laminated thick dark layer (Oba et al., 1991; Tada et al., 1999). According to salt and water budget calculation using a simple box model, freshening of the surface water salinity of the sea becomes evident when sill depth of the Tsushima Strait decreased below 30 m (Matsui et al., 1998). This is consistent with the occurrence of negative excursion of $\delta^{18}$O$_{pf}$ during MIS 2 (Oba et al., 1991, 1995) when eustatic sea level dropped below ca. -90 m. Our new $\delta^{18}$O$_{pf}$ result revealed that similar negative excursion of $\delta^{18}$O$_{pf}$ also occurred and euxinic bottom water condition prevailed during MIS 6 suggesting that eustatic sea level also dropped below ca. -90 m during this period (Figure 8). These evidences further confirm the linkage among glacio-eustatic sea level drops, the decrease in the surface water salinity, development of euxinic deepwater, and deposition of a finely-laminated dark layer. On the other hand, periods other than glacial maxima were characterized with deposition of centimeter to decimeter-scale alternations of dark laminated layers and light bioturbated layers with the dark layers corresponding to the DOC interstadials (Tada et al., 1999), suggesting the linkage among East Asian summer monsoon, Yangtze River discharge, and paleoceanographic condition of the Japan Sea.

In this way, it is now realized semi-quantitatively that paleoceanographic conditions (salinity, productivity, deepwater oxygenation, etc.) of the Japan Sea has been changed drastically in response to glacio-eustatic sea level changes and Asian monsoon variations during the last 160 ka. However, exploration of the physical dynamics of the ocean circulation and biogeochemical responses based on qualitative understanding of the mass budget has not been conducted yet.

In this project, we plan to examine the paleoceanographic responses of the Japan Sea to variations in glacioeustatic sea level and Asian monsoon using following parameters.

a) Sea-surface temperature [SST] and salinity [SSS]: We plan to reconstruct temporal variations of the SST and SSS using $\delta^{18}$O and Mg/Ca ratio of planktonic foraminifera because we expect drastic decrease in SSS during sea level lowstands below ca. -90 m, and slight
decrease in SSS during interstadials of the DOC. A shallower (316 m) site in the eastern margin of the sea (JS-10B) is selected to ensure continuous occurrence and better preservation of the calcareous microfossils since our high-resolution XRF-scanning analysis of the core from the site close to JS-1 revealed that carbonate compensation depth [CCD] in the Japan Sea occasionally shoaled shallower than 800 m during Quaternary (Figure 9). We also plan to reconstruct temporal variations in temperature gradient along the southern latitudinal transect (JS-10B, 1, 9, and 3) using alkenone and δ^{18}O to monitor N-S movement of the subpolar front. We also selected one site in the southwestern part of the Japan Sea (JS-11) for the same purpose, which is currently located at where the third branch of the TWC deflected to the east and detached from the eastern margin of Korean Peninsula. SST reconstruction at this site is desirable since direction of the subpolar front is not necessarily in E-W. We expect the position of the subpolar front to be closely associated with the position of westerly jet axis and oscillate in association with the DOC.

b) Deepwater ventilation: We plan to reconstruct temporal variation in the deepwater oxygenation level using the degree of lamina preservation, C/S ratio, concentration of redox sensitive elements, and δ^{13}C (planktonic – benthic) (e.g., Tada et al., 1999; Crusius et al., 1999) especially at deeper sites (JS-5B, 7B, and 9). We expect deepwater ventilation to be closely related to winter monsoon intensity and/or influx of TWC as is described above.

c) Surface productivity and CCD: We plan to reconstruct temporal variation in CCD based on the comparison of burial flux of biogenic carbonate between the nearby shallower and deeper sites (JS-1, 3 and 9; 4 and 5B, 7B). We also plan to reconstruct burial fluxes of biogenic silica and org-C and examine temporal changes in the nature and intensity of the surface production. We will utilize XRF scanner to estimate biogenic silica, carbonate, and water contents (Figure 9).

Based on these reconstructions, we plan to examine the interrelationships among above mentioned parameters and explore physical and biogeochemical aspects of the circulation
dynamics within the Japan Sea. We also plan to compare the reconstructed temporal variation of the paleoceanographic condition of the sea with that reconstructed from the sediments recovered from ECS-1 in order to clarify how paleoceanographic condition of the Japan Sea responded to the changes in the glacio-eustatic sea level and East Asian summer monsoon intensity in orbital and millennial time scales.

5. NEEDS FOR DRILLING

According to recent studies of Chinese loess, orbital-scale variability of Asian monsoon became evident at least after ca. 3.6 Ma (An et al., 2001). Whereas orbital-scale variability of East Asian monsoon before 3.6 Ma is not well understood because slower sedimentation rate and stronger pedogenic processes in Red Clay Formation tend to dump high frequency signals (Guo et al., 2001). However, recent study of late Miocene to Pliocene loess-paleosol sequence in western Loess Plateau by Hao and Guo (2004) suggests the presence of orbital-scale variability of East Asian summer monsoon before 3.6 Ma. Previous drilling result of the Japan Sea demonstrated the occurrence of orbital-scale variability in gamma-ray log during 1.0 to 2.8 Ma which is interpreted as reflecting orbital-scale variability of the East Asian monsoon (deMenocal et al., 1992), and could be useful method to detect the onset timing of orbital-scale variability of East Asian summer monsoon.

On the other hand, decimeter-scale alternations of the dark and light layers in the Japan Sea sediments, which reflect millennial-scale variability of East Asian summer monsoon, first appeared at ca. 2 Ma and became distinct at ca. 1.5 Ma according to examination of ODP Leg 127/128 core photographs. This timing roughly agrees with the oldest millennial-scale IRD events recorded in the north Atlantic sediments (Jansen et al., 2000; McIntyre et al., 2001; Raymo et al., 1998). Consequently, it is necessary to obtain continuous sedimentary records covering at least the last 2 m.y. and the last 5 m.y. to specify the onset timing of the millennial-scale and orbital-scale variabilities of the East Asian monsoon, respectively. Based on the results of Leg 127/128 as well as IMAGES cores, drilling of 130
Based on the results of Leg 127/128 as well as IMAGES cores, drilling of 130 to 300 m and 300 to 700 m is necessary to cover the last 2 m.y. and 5 m.y., respectively. Drilling by IODP is the only way to recover such long sedimentary records in excess of 100 m from the deep ocean floor.

Some of the proposed sites are close from the sites previously drilled during Leg 127/128. However, core splicing was not conducted except at Site 798, so core gaps exist. Also color measurement was not conducted and available MST data were limited and low in resolution. In addition, calcareous microfossils were mostly dissolved during core storage because oxidation of labile organic carbon and pyrite, which are enriched in the Japan Sea sediments, resulted in acidic solution. Consequently, the cores are unusable for isotope, organic, and inorganic chemical analyses. For these reasons, it is necessary to drill and obtain new cores.

6. DRILLING SITES AND REQUIRED TIME FOR DRILLING

Eight sites are proposed to drill in the Japan Sea, which are composed of a southern latitudinal transect (JS-3, 9, 1, and 10B), a northern latitudinal transect (JS-5B, 4, and 7B), and JS-11 in the southwestern margin of the Japan Sea. In addition, ECS-1 is proposed to drill in the northeastern part of the East China Sea.

1) Southern latitudinal transect (JS-3, 9, 1, and 10B): JS-3, 9, and 1 are selected to reconstruct temporal variation of westerly jet axis position and southern limit of the winter monsoon. These 3 sites cover the latitudinal range from 37 to 40°N, which nearly agrees with the present range of seasonal variation in westerly jet axis position. JS-1 and 3 are most suitable for the eolian dust study because they are located on the bank and free from detrital grains transported by gravity flows and bottom currents from the Japanese Arc and the margin of Eurasian continent. JS-9 (= Site 797) is located on the northwestern margin of the Yamato Basin slightly above the basin floor, and its sedimentary record is continuous and free of turbidites (Tada and Iijima, 1992; Tada, 1994). Irino and Tada (2000, 2003) demonstrated that 30 to 60 % of the detrital material at Sites 797 is of eolian dust origin.
that 30 to 60% of the detrital material at Sites 797 is of eolian dust origin.

The southern latitudinal transect is also selected to monitor N-S movement of subpolar front. At present, subpolar front is located approximately at 39°N slightly to the south of JS-3. However, the front should have been at further south during glacial periods. Thus, this transect should cover the probable range of subpolar front movement. JS-10B, which is only 316 m in water depth, is specifically chosen to recover continuous δ¹⁸O and Mg/Ca records. In addition, JS-1 and 9, which form a depth transect in the southern part of the Japan Sea, will be used to reconstruct temporal variations in CCD and deepwater oxygenation level in the Yamato Basin. Since it is considered that orbital-scale variability of East Asian monsoon intensified at least from ca. 3.6 Ma and could be as old as 5 Ma, we propose to recover the sediments covering the last 4 to 5 m.y. Expected depths to reach this age at these sites range between 200 and 500 m. We propose to drill triple holes with APC for the upper 100 m and double holes to the termination depths with APC (to 200 m), and XCB (to 500 m). Total penetration length will be ca. 3100 m, and estimated time for drilling will be 20 days.

2) Northern latitudinal transect (JS-5B, 4, and 7B): JS-5B, 4, and 7B are selected to reconstruct temporal variations in the intensity and southern extent of IRD events, which we believe are reflecting winter monsoon intensity. According to Ikehara (2003), 40°N is the southern limit of IRD occurrence and the southern limit of IRD distribution shifted between 40°N and 45°N during the last 170 ka. This range is appropriately covered by these 3 sites. These 3 sites will be also used for the eolian dust study to cover higher latitudinal range from 40 to 45°N. Nagasima (2005) demonstrated that detrital silt fraction of the sediments at KT94-15-5 (= ODP Site 794) is mostly of eolian origin. We expect similar are the cases for JS-4 and 5B judging from their terrigenous MARs which are comparable to eolian dust flux. These two sites are occasionally influenced by IRD, but if we avoid IRD horizons, the sediments should be usable for the eolian dust study. JS-4 and 5B form another depth
transect in the northern part of the Japan Sea, and will be also used to reconstruct temporal variations in CCD and deepwater oxygenation level in the Japan Basin. We propose to recover the sediments covering the last 4 to 5 m.y. Expected depths to reach this age at these sites range between 150 and 250 m. We propose to drill triple holes with APC for the upper 100 m and double holes to the termination depths with APC (to 200 m), and XCB (to 250 m). Total penetration length will be ca. 1500 m, and estimated time for drilling will be 10 days.

3) Western margin of the Japan Sea (JS-11): JS-11 is located on the western margin of the Japan Sea and approximately where third branch of the TWC deflected to the east from the eastern margin of Korean Peninsula. This site is also selected to monitor the behavior of the subpolarfront. Because the flow direction of the third branch of the TWC is not necessarily E-W, additional monitoring point is desirable. JS-11 is also adequate site for eolian dust study since it is located on the bank and away from major rivers. Inclusion of this site expands longitudinal coverage. So, we plan to use a JS-11 and JS-1 combined with onland sites in China and Honshu Island to examine temporal changes in the downwind decrease in eolian dust grain size and flux. This is for the purpose of examining whether changes in eolian dust grain size and flux in the Japan Sea sediments reflect changes in westerly jet intensity or changes in distance from the arid area inland East Asia. We propose to drill to 200 m at JS-11 to cover the last 4 to 5 m.y. We propose to drill triple holes with APC for top 100 m and double holes to 200 m with APC and to the termination depth with XCB. Total penetration length will be 600 m and estimated time for drilling will be 4 days.

4) Northeastern part of the East China Sea (ECS-1): ECS-1 is selected to examine changes in surface water condition in the northern part of the ECS and the nature and intensity of the terrigenous material discharge from the Yangtze River in order to reconstruct temporal changes in Asian summer monsoon intensity. We aim to recover the continuous sedimentary record covering the last 5 m.y. The expected drilling depth is 500 m. We propose to drill
triple to the depth of 100 m with APC and then drill double with XCB. The total penetration length will be 1100 m and estimated time for drilling will be 7 days.

In total, the proposed drilling length will be 6300 m and estimated total time for drilling will be 41 days. In addition, 10 days will be needed to travel between the sites. Consequently, the estimate time for the leg will be 51 days.

7. PRESENT STATUS AND FUTURE PLAN FOR THE SITE SURVEY

All the proposed sites have a seismic line transecting the sites. However, JS-3, 5B, 10B, and 11 do not have crossed seismic lines at this moment. Additional site survey is scheduled from July 26th to 31th this year in the northern part of the Japan Sea to obtain the second seismic line and a piston core sample at JS-5B and to survey alternate sites of JS-3 and 7B. At least one piston or gravity core was obtained and analyzed at all the proposed sites. JS-1, 7B, and 9 are nearly identical to the locations of ODP Sites 798, 794, and 797, where continuous hemipelagic sedimentary records and the safety during the drilling were confirmed. JS-5B is located ca. 40 km to the southwest of ODP Site 795 where similar sedimentary records are expected. In addition, 56 m and 38 m long piston cores were recently obtained from JS-1 and ECS-1 respectively by IMAGES cruise, and some of the results were already published (Tada, 2004; Ijiri et al., 2005; Kawahata and Oshima, 2004) and also available as doctoral theses (Fujine, 2004; Nagashima, 2005).

8. EXPECTED OUTCOME AND RESEARCH PLAN AFTER DRILLING

Following achievements will be expected through the drilling, subsequent sample analyses, and data synthesis.

1) Specifying the timings of onset and intensification of orbital and millennial-scale variabilities of East Asian summer monsoon, winter monsoon, and westerly jet axis movement, and clarifying their evolutionary processes within a temporal and spatial
framework.

2) Understanding the interrelationships among the behaviors of East Asian summer monsoon, winter monsoon, and westerlies within a temporal and spatial framework.

3) Examining the potential linkage between the onset and evolution of orbital and millennial-scale variabilities in East Asian monsoon and westerlies, and uplift of Himalaya and Tibet.

4) Understanding the mechanism that links the orbital and millennial-scale variabilities in East Asian monsoon and westerlies, and paleoceanographic changes in the Japan Sea.

In order to accomplish the objectives of this proposal and obtain successful results, carefully arranged sampling and analysis plan as well as close communication among the participants of the project are necessary. This proposal is prepared as a part of collaboration effort of IGCP project 476 “Monsoon evolution and tectonic-climate linkage in East Asia and its marginal seas during the late Cenozoic” (co-leaders: Tada, Zheng, Khim, Clift, Gorbarenko, Nath), and a network of close communication and a working group preparing for the IODP drilling of the Japan Sea are already established. Thus, we are ready for coordinating an international cooperative group that will conduct core analyses when this proposal will be accepted.
Figure 1: Hypothesized two modes of westerly jet circulation patterns in the northern hemisphere corresponding to stadials and interstadials of the DOC. The sense of shifts seems to have been opposite between East Asia and Mediterranean areas (inserted figure). HTP should play a role of topographic barrier. Also shown are distribution of deserts and loess in inland East Asia and location of Hulu cave, KT94-15-5, and MD01-2407.

Figure 2: A bathymetric map showing localities of the nine proposed sites (red circles) for drilling in the Japan Sea and the East China Sea. Sites previously drilled by DSDP and ODP (open circles) and alternate sites proposed in older version of this proposal (small solid circles) are also shown. Also illustrated are surface current systems within and surrounding the Japan Sea.
Figure 3: A diagram showing the cross-plot between crystallinity index versus ESR signal intensity of quartz in samples from KT94-15-5 (= JS-7B) and MD01-2407 (=JS-1). Also shown are the areas representing estimated end members; Taklimakan-Loess Plateau, Northeast China-Siberia, and clay sized quartz from the Japan Arc. Most of the data fall within the triangle area suggesting quartz in the sediments can be explained as a mixture of the three end members, and the relative proportions of the three end members can be estimated.

Figure 4: Temporal variations in L* (c), eolian dust median diameters at southern (MD01-2407 = JS-1) and northern (KT94-15-5 = JS-7B) sites (d), and contribution of eolian quartz from Taklimakan-Loess Plateau relative to that from Northeast China-Siberia at MD01-2407 (e) during the last 160 ky. Positions of correlation horizons between the two sites are shown as arrows in (d). Also shown are standard oxygen isotope curve by Martinson et al. (1987) (a) and insolation at 30°N in June (b). Age model is based on 14C dates in Figure 6, 3 tephra layers shown as pink in (c) and (d), and oxygen isotope stages based on Figure 8.
Figure 5: Temporal variation in IRD content at GH95-1208 (= JS-5B) during the last 160 k.y. correlated to \( L^* \) profile at MD01-2407 (= JS-1). Sharp IRD events tend to agree with horizons of high \( L^* \) values that tends to coincide with Heinrich events. Also shown is correlation with \( \delta^{18}O \) records of GISP 2 ice core and Hulu Cave stalagmite.

Figure 6: Correlation between \( \delta^{18}O \) records of GISP 2 ice core and \( L^* \) of MD01-2407 of which age model is constructed based on 14\(^{14}C\) ages (Yokoyama et al., unpublished) and one tephra layer (a). A diagram on the right side shows that the assumption that onset of the DO interstadials are synchronous with the start of deposition of dark layers (red line) is consistent with \( ^{14}C \) dates within analytical uncertainties (b).
Figure 7: Phosphorous budget in the Japan Sea (Tada, 2003 MS).

Figure 8: Oxygen isotope ratio of planktonic foraminifers in the sediments from MD01-2407 core during the last 250 ky. Age model is based on 14C dates and 3 tephra layers (AT, Aso-4, and Ata-Th of which ages are well constrained). Stratigraphic intervals characterized by thinly laminated thick dark layers are shaded. Kido et al. (2005 MS).
Figure 9: Temporal variations in biogenic carbonate (a), biogenic silica (b), terrigenous material (c), and water content (d) of MD01-2407 core based on high-resolution quantitative analysis by XRF microscanner (Kido et al., unpublished). Intervals of carbonate dissolution are shaded.
References


democal, P.B., Bristow, J.F., and Stein, R., Paleoclimatic applications of downcore logs:


Fujine, K., Fluctuation of the alkenone SST in the Japan Sea during the last 160kys, doctoral thesis, the University of Tokyo, 2004.


Ichikawa, H., and Beardsley, R.C., The current system in the Yellow and East China seas, *Jour.
Irino, T., and Tada, R., High-resolution reconstruction of variation in aeolian dust (Kosa) deposition at ODP site 797, the Japan Sea, during the last 200 ka, Global and Planetary Change, 35, 143-156, 2003.
Irino, T., and Tada, R., Quantification of aeolian dust (Kosa) contribution to the Japan Sea sediments and its variation during the last 200 ky, Geochem. J., 34, 59-93, 2000.
Li, J.J., et al., Late Cenozoic magnetostratigraphy (11-0 Ma) of the Dongshanding and Wangjiashan section in the Longzhong Basin, western China, Geol. Mijnbouw, 76, 121-134, 1997.
Nagashima, K., Reconstruction of millennial-scale variation in eolian dust transport path to the Japan Sea based on grain size and ESR analyses, doctoral thesis, the University of Tokyo, 2005.
Oba, T., Kato, M., Kitazato, H., Koizumi, I., Omura, A., Sakai, T., and Takayama, T., Paleoenvironmental changes in the Japan Sea during the last 85,000 years, Paleoceanography, 6, 499-518, 1991.


Tada, R., Koizumi, I., Cramp, A., and Rahman, A., Correlation of dark and light layers, and the


### Section A: Proposal Information

**Title of Proposal:**
Onset and evolution of millennial-scale variability of Asian monsoon and its possible relation with Himalaya and Tibetan Plateau uplift

**Date Form Submitted:**
April 1st 2005

**Site Specific Objectives with Priority**
High-resolution reconstruction of dust flux as well as other paleoceanographic records in the southern part of Japan Sea during the last 4 m.y.

**List Previous Drilling in Area:**
ODP Site 798

### Section B: General Site Information

<table>
<thead>
<tr>
<th><strong>Site Name:</strong> JS-1 (ODP site 798)</th>
<th><strong>Area or Location:</strong> Oki Ridge, Japan Sea</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Latitude:</strong> Deg: 37N Min: 02</td>
<td><strong>Jurisdiction:</strong> Japanese EEZ</td>
</tr>
<tr>
<td><strong>Longitude:</strong> Deg: 134E Min: 48</td>
<td><strong>Distance to Land:</strong> 130 km</td>
</tr>
<tr>
<td><strong>Coordinates System:</strong> WGS 84</td>
<td><strong>Water Depth:</strong> 930 m</td>
</tr>
<tr>
<td><strong>Priority of Site:</strong> Primary: Alt:</td>
<td></td>
</tr>
</tbody>
</table>
### Section C: Operational Information

<table>
<thead>
<tr>
<th>Proposed Penetration: (m)</th>
<th>Sediments</th>
<th>Basement</th>
</tr>
</thead>
<tbody>
<tr>
<td>400 m</td>
<td>None</td>
<td>1200 m</td>
</tr>
</tbody>
</table>

What is the total sed. thickness?

<table>
<thead>
<tr>
<th>General Lithologies:</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Coring Plan: (Specify or check)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2-3-APC</td>
<td>VPC*</td>
</tr>
</tbody>
</table>

* Sections Currently Under Development

<table>
<thead>
<tr>
<th>Wireline Logging Plan:</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Standard Tools</th>
<th>Special Tools</th>
<th>LWD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutron-Porosity</td>
<td>Borehole Televiewer</td>
<td>Formation Fluid Sampling</td>
</tr>
<tr>
<td>Litho-Density</td>
<td>Nuclear Magnetic Resonance</td>
<td>Borehole Temperature &amp; Pressure</td>
</tr>
<tr>
<td>Gamma Ray</td>
<td>Geochemical</td>
<td>Borehole Seismic</td>
</tr>
<tr>
<td>Resistivity</td>
<td>Side-Wall Core Sampling</td>
<td>Others ( )</td>
</tr>
<tr>
<td>Acoustic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formation Image</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Maximum Borehole Temp.:**

**Expected value (For Riser Drilling):**

**Mud Logging: (Riser Holes Only):**

<table>
<thead>
<tr>
<th>Cuttings Sampling Intervals</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>from _______ m to _______ m, _______ m intervals</td>
<td></td>
</tr>
<tr>
<td>from _______ m to _______ m, _______ m intervals</td>
<td></td>
</tr>
</tbody>
</table>

**Estimated days:**

Drilling/Coring: 4 days  Logging: 2 day  Total On-Site: 6 days

**Future Plan:**

Longterm Borehole Observation Plan/Re-entry Plan

**Hazards/ Weather:**

Please check following List of Potential Hazards

<table>
<thead>
<tr>
<th>Hydrocarbon</th>
<th>Soil Sediment</th>
<th>Landslide and Turbidity Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shallow Gas</td>
<td>Complicated Seabed Condition</td>
<td>Hydrothermal Activity</td>
</tr>
<tr>
<td>Shallow Water Flow</td>
<td>Currents</td>
<td>Methane Hydrate</td>
</tr>
<tr>
<td>Abnormal Pressure</td>
<td>Fractured Zone</td>
<td>Diapir and Mud</td>
</tr>
<tr>
<td>Man-made Objects</td>
<td>Fault</td>
<td>High Temperature</td>
</tr>
<tr>
<td>H₂S</td>
<td>High Dip Angle</td>
<td>Ice Conditions</td>
</tr>
<tr>
<td>CO₂</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What is your Weather window? (Preferable period with the reasons)

March to August
**IODP Site Summary Forms:**

Please fill out information in all gray boxes

---

**Form 2 - Site Survey Detail**

<table>
<thead>
<tr>
<th>Proposal #: 605-full2</th>
<th>Site #: JS-1</th>
<th>Date Form Submitted: April 1st 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Data Type</strong></td>
<td><strong>SSP Requirements</strong></td>
<td><strong>Exists In DB</strong></td>
</tr>
</tbody>
</table>
| 1 | High resolution seismic reflection | Yes | Primary Line(s): GH874, 23:50 September 19  
Crossing Lines(s): GH874, 06:05 October 2 |
| 2 | Deep Penetration seismic reflection |  | Primary Line(s): Location of Site on line (SP or Time only)  
Crossing Lines(s): Location of Site on line (SP or Time only) |
| 3 | Seismic Velocity |  |  |
| 4 | Seismic Grid |  |  |
| 5a | Refraction (surface) |  |  |
| 5b | Refraction (near bottom) |  |  |
| 6 | 3.5 kHz | Yes | GH874, 23:50 September 19  
Location of Site on line (Time) |
| 7 | Swath bathymetry |  |  |
| 8a | Side-looking sonar (surface) |  |  |
| 8b | Side-looking sonar (bottom) |  |  |
| 9 | Photography or Video |  |  |
| 10 | Heat Flow | Yes | ODP site 798 |
| 11a | Magnetics | Yes | Compiled map published from Geological Survey of Japan |
| 11b | Gravity | Yes | Compiled map published from Geological Survey of Japan |
| 12 | Sediment cores | Yes | ODP site 798 |
| 13 | Rock sampling |  |  |
| 14a | Water current data | Yes | JODC web page (http://www.jodc.go.jp) |
| 14b | Ice Conditions |  |  |
| 15 | OBS microseismicity |  |  |
| 16 | Navigation |  |  |
| 17 | Other |  |  |

**SSP Classification of Site:**  
**SSP Watchdog:**  
**Date of Last Review:**

**SSP Comments:**

X=required; X*=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites;  
R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.
**Form 3 - Detailed Logging Plan**

**IODP Site Summary Forms:**

<table>
<thead>
<tr>
<th>Proposal #: 605-full2</th>
<th>Site #: JS-1</th>
<th>Date Form Submitted: April 1st 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Depth (m): 930 m</td>
<td>Sed. Penetration (m): 400 m</td>
<td>Basement Penetration (m):</td>
</tr>
</tbody>
</table>

Do you need to use the conical side-entry sub (CSES) at this site?  Yes [ ]  No [ ]
Are high temperatures expected at this site? Yes [ ]  No [ ]
Are there any other special requirements for logging at this site? Yes [ ]  No [ ]
If “Yes” Please describe requirements: __________________________________________________________

What do you estimate the total logging time for this site to be: ____________________

<table>
<thead>
<tr>
<th>Measurement Type</th>
<th>Scientific Objective</th>
<th>Relevance (1=High, 3=Low)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutron-Porosity</td>
<td>Estimation of water content in sedimentary sequences.</td>
<td>3</td>
</tr>
<tr>
<td>Litho-Density</td>
<td>Estimation of water content, bulk density, and mineral composition in sedimentary sequences.</td>
<td>3</td>
</tr>
<tr>
<td>Natural Gamma Ray</td>
<td>Estimation of clay contents and mineral composition in sedimentary sequences.</td>
<td>1</td>
</tr>
<tr>
<td>Resistivity-Induction</td>
<td>Estimation of water content and electro-magnetic properties in sedimentary sequences.</td>
<td>1</td>
</tr>
<tr>
<td>Acoustic</td>
<td>Determination of in situ velocity and estimation of physical properties.</td>
<td>1</td>
</tr>
<tr>
<td>FMS</td>
<td>Imaging of sedimentary structures and fractures.</td>
<td>1</td>
</tr>
<tr>
<td>BHTV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistivity-Laterolog</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnetic/Susceptibility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Density-Neutron (LWD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistivity-Gamma Ray</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(LWD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group at: borehole@ldeo.columbia.edu  http://www.ldeo.columbia.edu/BRG/brg_home.html  Phone/Fax: (914) 365-8674 / (914) 365-3182

Note: Sites with greater than 400 m of penetration or significant basement penetration require deployment of standard toolstrings.
## IODP Site Summary Forms:

Please fill out information in all gray boxes

<table>
<thead>
<tr>
<th>Proposal #: 605-full12</th>
<th>Site #: JS-1</th>
<th>Date Form Submitted: April 1st 2005</th>
</tr>
</thead>
</table>

1. **Summary of Operations at site:**
   (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)
   - Triple-APC to 100 mbsf, then double-APC to 200 mbsf. Double-XCB to 400 mbsf.

2. **Based on Previous DSDP/ODP drilling,** list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:

3. **From Available information,** list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits:

4. **Are there any indications of gas hydrates at this location?**

5. **Are there reasons to expect hydrocarbon accumulations at this site? Please give details.**

6. **What “special” precautions will be taken during drilling?**

7. **What abandonment procedures do you plan to follow?**

8. **Please list other natural or manmade hazards which may effect ship’s operations:**
   (e.g. ice, currents, cables)
   - Typhoon (June to October)

9. **Summary: What do you consider the major risks in drilling at this site?**
# IODP Site Summary Forms:

## Form 5 – Lithologic Summary

Proposal #: 605-full2  | Site #: JS-1  | Date Form Submitted: April 1st 2005

<table>
<thead>
<tr>
<th>Sub-bottom depth (m)</th>
<th>Key reflectors, Unconformities, faults, etc</th>
<th>Age</th>
<th>Assumed velocity (km/sec)</th>
<th>Lithology</th>
<th>Paleo-environment</th>
<th>Avg. rate of sed. accum. (m/My)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>400</td>
<td></td>
<td>4 Ma</td>
<td>Hemipelagic clay to silt</td>
<td></td>
<td></td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
Section A: Proposal Information

**Title of Proposal:**
Onset and evolution of millennial-scale variability of Asian monsoon and its possible relation with Himalaya and Tibetan Plateau uplift

**Date Form Submitted:**
April 1st 2005

**Site Specific Objectives with Priority**
High-resolution reconstruction of dust flux as well as other paleoceanographic records in the southern part of Japan Sea during the last 5 m.y.

**List Previous Drilling in Area:**
ODP Site 799

---

Section B: General Site Information

<table>
<thead>
<tr>
<th>Site Name: JS-3</th>
<th>If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #</th>
<th>Area or Location: Yamato Ridge, Japan Sea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latitude:</td>
<td>Deg: 40N Min: 07</td>
<td>Jurisdiction: Russian EEZ</td>
</tr>
<tr>
<td>Longitude:</td>
<td>Deg: 134E Min: 00</td>
<td>Distance to Land: 300 km</td>
</tr>
<tr>
<td>Coordinates System:</td>
<td>Other (Tokyo datum)</td>
<td>Water Depth: 1150 m</td>
</tr>
<tr>
<td>Priority of Site:</td>
<td>Primary: Alt.</td>
<td></td>
</tr>
</tbody>
</table>

### Section C: Operational Information

<table>
<thead>
<tr>
<th>Sediments</th>
<th>Basement</th>
</tr>
</thead>
<tbody>
<tr>
<td>250 m</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>General Lithologies:</td>
<td>Diatomaceous clay to silt</td>
</tr>
<tr>
<td>----------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>Proposed Penetration: (m)</td>
<td>What is the total sed thickness?</td>
</tr>
<tr>
<td></td>
<td>500 m</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Coring Plan: (Specify or check)</th>
<th>1-2-3-APC</th>
<th>VPC*</th>
<th>XCB</th>
<th>MDCB*</th>
<th>PCS</th>
<th>RCB</th>
<th>Re-entry</th>
<th>HRGB</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Wireline Logging Plan:</th>
<th>Standard Tools</th>
<th>Special Tools</th>
<th>LWD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutron-Porosity</td>
<td>Borehole Televiewer</td>
<td>Formation Fluid Sampling</td>
<td>Density-Neutron</td>
</tr>
<tr>
<td>Litho-Density</td>
<td>Nuclear Magnetic Resonance</td>
<td>Borehole Temperature &amp; Pressure</td>
<td>Resistivity-Gamma</td>
</tr>
<tr>
<td>Gamma Ray</td>
<td>Geochemical</td>
<td>Borehole Seismic</td>
<td>Acoustic</td>
</tr>
<tr>
<td>Resistivity</td>
<td>Side-Wall Core Sampling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acoustic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formation Image</td>
<td>Others ( )</td>
<td>Others ( )</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Max. Borehole Temp.</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected value (For Riser Drilling)</td>
<td>°C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mud Logging: (Riser Holes Only)</th>
<th>Cuttings Sampling Intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td>from</td>
<td>to</td>
</tr>
<tr>
<td>from</td>
<td>to</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Estimated days:</th>
<th>Drilling/Coring: 3 days</th>
<th>Logging: 1 day</th>
<th>Total On-Site: 4 days</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Future Plan:</th>
<th>Longterm Borehole Observation Plan/Re-entry Plan</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Hazards/Weather:</th>
<th>Please check following List of Potential Hazards</th>
<th>What is your Weather window? (Preferable period with the reasons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shallow Gas</td>
<td>Complicated Seabed Condition</td>
<td>□</td>
</tr>
<tr>
<td>Hydrocarbon</td>
<td>Soil Seabed</td>
<td>□</td>
</tr>
<tr>
<td>Shallow Water Flow</td>
<td>Currents</td>
<td>□</td>
</tr>
<tr>
<td>Abnormal Pressure</td>
<td>Fractured Zone</td>
<td>□</td>
</tr>
<tr>
<td>Man-made Objects</td>
<td>Fault</td>
<td>□</td>
</tr>
<tr>
<td>H₂S</td>
<td>High Dip Angle</td>
<td>□</td>
</tr>
<tr>
<td>CO₂</td>
<td></td>
<td>□</td>
</tr>
</tbody>
</table>

March to August
# IODP Site Summary Forms:

**Form 2 - Site Survey Detail**

Please fill out information in all gray boxes.

<table>
<thead>
<tr>
<th>Proposal #: 605-full2</th>
<th>Site #: JS-3</th>
<th>Date Form Submitted: April 1st 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Type</td>
<td>SSP Requirements</td>
<td>Exists In DB</td>
</tr>
<tr>
<td>1</td>
<td>High resolution seismic reflection</td>
<td>Yes</td>
</tr>
<tr>
<td>2</td>
<td>Deep Penetration seismic reflection</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Seismic Velocity†</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Seismic Grid</td>
<td></td>
</tr>
<tr>
<td>5a</td>
<td>Refraction (surface)</td>
<td></td>
</tr>
<tr>
<td>5b</td>
<td>Refraction (near bottom)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>3.5 kHz</td>
<td>Yes</td>
</tr>
<tr>
<td>7</td>
<td>Swath bathymetry</td>
<td></td>
</tr>
<tr>
<td>8a</td>
<td>Side-looking sonar (surface)</td>
<td></td>
</tr>
<tr>
<td>8b</td>
<td>Side-looking sonar (bottom)</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Photography or Video</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Heat Flow</td>
<td></td>
</tr>
<tr>
<td>11a</td>
<td>Magnetics</td>
<td></td>
</tr>
<tr>
<td>11b</td>
<td>Gravity</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Sediment cores</td>
<td>Yes</td>
</tr>
<tr>
<td>13</td>
<td>Rock sampling</td>
<td></td>
</tr>
<tr>
<td>14a</td>
<td>Water current data</td>
<td></td>
</tr>
<tr>
<td>14b</td>
<td>Ice Conditions</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>OBS microseismicity</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Navigation</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>

SSP Classification of Site:  
SSP Watchdog:  
Date of Last Review:  
SSP Comments:  

X=required; X*=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites;  
R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.
### IODP Site Summary Forms:

<table>
<thead>
<tr>
<th>Proposal #:</th>
<th>605-full2</th>
<th>Site #:</th>
<th>JS-3</th>
<th>Date Form Submitted:</th>
<th>April 1st 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Depth (m):</td>
<td>1150 m</td>
<td>Sed. Penetration (m):</td>
<td>250 m</td>
<td>Basement Penetration (m):</td>
<td></td>
</tr>
</tbody>
</table>

Do you need to use the conical side-entry sub (CSES) at this site?  
Yes [ ] No [ ]

Are high temperatures expected at this site?  
Yes [ ] No [ ]

Are there any other special requirements for logging at this site?  
Yes [ ] No [ ]

If “Yes” Please describe requirements: __________________________

What do you estimate the total logging time for this site to be: ____________

<table>
<thead>
<tr>
<th>Measurement Type</th>
<th>Scientific Objective</th>
<th>Relevance (1=high, 3=Low)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutron-Porosity</td>
<td>Estimation of water content in sedimentary sequences.</td>
<td>3</td>
</tr>
<tr>
<td>Litho-Density</td>
<td>Estimation of water content, bulk density, and mineral composition in</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>sedimentary sequences.</td>
<td></td>
</tr>
<tr>
<td>Natural Gamma Ray</td>
<td>Estimation of clay contents and mineral composition in sedimentary</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>sequences.</td>
<td></td>
</tr>
<tr>
<td>Resistivity-Induction</td>
<td>Estimation of water content and electro-magnetic properties in</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>sedimentary sequences.</td>
<td></td>
</tr>
<tr>
<td>Acoustic</td>
<td>Determination of in situ velocity and estimation of physical properties.</td>
<td>1</td>
</tr>
<tr>
<td>FMS</td>
<td>Imaging of sedimentary structures and fractures.</td>
<td>1</td>
</tr>
<tr>
<td>BHTV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistivity-Laterolog</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnetic/Susceptibility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Density-Neutron (LWD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistivity-Gamma Ray</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(LWD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other: Special tools</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(CORK, PACKER, VSP, PCS, FWS, WSP)</td>
<td></td>
</tr>
</tbody>
</table>

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group at:  
borehole@ldeo.columbia.edu  
http://www.ldeo.columbia.edu/BRG/brg_home.html  
Phone/Fax: (914) 365-8674 / (914) 365-3182

Note: Sites with greater than 400 m of penetration or significant basement penetration require deployment of standard toolstrings.
# IODP Site Summary Forms:

Please fill out information in all gray boxes

<table>
<thead>
<tr>
<th>Proposal #: 605-full2</th>
<th>Site #: JS-3</th>
<th>Date Form Submitted: April 1st 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong> Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)</td>
<td>Triple-APC to 100 mbsf, then double-APC to 200 mbsf. Double-XCB to 250 mbsf.</td>
<td></td>
</tr>
<tr>
<td><strong>2</strong> Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3</strong> From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>4</strong> Are there any indications of gas hydrates at this location?</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>5</strong> Are there reasons to expect hydrocarbon accumulations at this site? Please give details.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>6</strong> What “special” precautions will be taken during drilling?</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>7</strong> What abandonment procedures do you plan to follow:</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>8</strong> Please list other natural or manmade hazards which may effect ship’s operations: (e.g. ice, currents, cables)</td>
<td>Typhoon (June to October)</td>
<td></td>
</tr>
<tr>
<td><strong>9</strong> Summary: What do you consider the major risks in drilling at this site?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
IODP Site Summary Forms:

Form 5 – Lithologic Summary

Proposal #: 605-full2  Site #: JS-3  Date Form Submitted: April 1st 2005

<table>
<thead>
<tr>
<th>Sub-bottom depth (m)</th>
<th>Key reflectors, Unconformities, faults, etc</th>
<th>Age</th>
<th>Assumed velocity (km/sec)</th>
<th>Lithology</th>
<th>Paleo-environment</th>
<th>Avg. rate of sed. accum. (m/My)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>250</td>
<td></td>
<td>5 Ma</td>
<td></td>
<td>Hemipelagic clay to silt</td>
<td></td>
<td>50</td>
<td></td>
</tr>
</tbody>
</table>
## Section A: Proposal Information

**Title of Proposal:**
Onset and evolution of millennial-scale variability of Asian monsoon and its possible relation with Himalaya and Tibetan Plateau uplift

**Date Form Submitted:**
April 1st 2005

**Site Specific Objectives with Priority**
High-resolution reconstruction of dust flux as well as other paleoceanographic records in the southern part of Japan Sea during the last 4 m.y.

**List Previous Drilling in Area:**
ODP Site 796 was conducted about 170 km north of this proposal site.

## Section B: General Site Information

<table>
<thead>
<tr>
<th>Site Name: (e.g. SWPAC-01A)</th>
<th>Area or Location:</th>
<th>Jurisdiction:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>JS-4</strong></td>
<td>Matsumae Plateau, Japan Sea</td>
<td>Japanese EEZ</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Latitude:</th>
<th>Longitude:</th>
<th>Coordinates System:</th>
<th>Distance to Land:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deg: 41N</td>
<td>Deg: 139E</td>
<td>Other (Tokyo datum)</td>
<td>100 km</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Priority of Site:</th>
<th>Water Depth:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary: Alt:</td>
<td>1785 m</td>
</tr>
</tbody>
</table>
### Section C: Operational Information

<table>
<thead>
<tr>
<th>Proposed Penetration: (m)</th>
<th>Sediments</th>
<th>Basement</th>
</tr>
</thead>
<tbody>
<tr>
<td>250 m</td>
<td>350 m</td>
<td>None</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>General Lithologies:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diatomaceous clay to silt</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Coring Plan: (Specify or check)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2-3-APC ■ VPC* ■ XCB ■ MDCB ■ PCS ■ RCB ■ Re-entry ■ HRGB ■</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wireline Logging Plan:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Tools</td>
</tr>
<tr>
<td>Neutron-Porosity ■</td>
</tr>
<tr>
<td>Litho-Density ■</td>
</tr>
<tr>
<td>Gamma Ray ■</td>
</tr>
<tr>
<td>Resistivity ■</td>
</tr>
<tr>
<td>Acoustic ■</td>
</tr>
<tr>
<td>Formation Image ■</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Max. Borehole Temp. :</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected value (For Riser Drilling)</td>
</tr>
<tr>
<td>____________________________ ºC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mud Logging: (Riser Holes Only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cuttings Sampling Intervals</td>
</tr>
<tr>
<td>from ______ m to ______ m, ______ m intervals</td>
</tr>
<tr>
<td>from ______ m to ______ m, ______ m intervals</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Estimated days:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drilling/Coring: 3 days</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Future Plan:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Longterm Borehole Observation Plan/Re-entry Plan</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hazards/Weather:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please check following List of Potential Hazards</td>
</tr>
<tr>
<td>Shallow Gas □</td>
</tr>
<tr>
<td>Hydrocarbon □</td>
</tr>
<tr>
<td>Shallow Water Flow □</td>
</tr>
<tr>
<td>Abnormal Pressure □</td>
</tr>
<tr>
<td>Man-made Objects □</td>
</tr>
<tr>
<td>H2S □</td>
</tr>
<tr>
<td>CO2 □</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What is your Weather window? (Preferable period with the reasons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>March to August</td>
</tr>
</tbody>
</table>

*Sections Currently Under Development*
### IODP Site Summary Forms:

**Form 2 - Site Survey Detail**

Please fill out information in all gray boxes

<table>
<thead>
<tr>
<th>Proposal #: 605-full2</th>
<th>Site #: JS-4</th>
<th>Date Form Submitted: April 1st 2005</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Data Type</th>
<th>SSP Requirements</th>
<th>Exists in DB</th>
<th>Details of available data and data that are still to be collected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. High resolution seismic reflection</td>
<td>Yes</td>
<td></td>
<td>Primary Line(s): GH94 line 1009, 02:05 July 25</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Location of Site on line (SP or Time only)</td>
</tr>
<tr>
<td>2. Deep Penetration seismic reflection</td>
<td></td>
<td></td>
<td>Primary Line(s):</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Location of Site on line (SP or Time only)</td>
</tr>
<tr>
<td>3. Seismic Velocity†</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Seismic Grid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5a. Refraction (surface)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5b. Refraction (near bottom)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. 3.5 kHz</td>
<td>Yes</td>
<td></td>
<td>GH94 line 1009, 02:05 July 25</td>
</tr>
<tr>
<td>7. Swath bathymetry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8a. Side-looking sonar (surface)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8b. Side-looking sonar (bottom)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Photography or Video</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Heat Flow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11a. Magnetics</td>
<td>Yes</td>
<td></td>
<td>Compiled map published from Geological Survey of Japan</td>
</tr>
<tr>
<td>11b. Gravity</td>
<td>Yes</td>
<td></td>
<td>Compiled map published from Geological Survey of Japan</td>
</tr>
<tr>
<td>12. Sediment cores</td>
<td>Yes</td>
<td></td>
<td>GH96-1217</td>
</tr>
<tr>
<td>13. Rock sampling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14a. Water current data</td>
<td>Yes</td>
<td></td>
<td>JODC web page (<a href="http://www.jodc.go.jp">http://www.jodc.go.jp</a>)</td>
</tr>
<tr>
<td>14b. Ice Conditions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. OBS microseismicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Other</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SSP Classification of Site:**

**SSP Watchdog:**

**Date of Last Review:**

**SSP Comments:**

X=required; X*=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.
# IODP Site Summary Forms:

**Form 3 - Detailed Logging Plan**

<table>
<thead>
<tr>
<th>Proposal #: 605-full2</th>
<th>Site #: JS-4</th>
<th>Date Form Submitted: April 1st 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Depth (m): 1785 m</td>
<td>Sed. Penetration (m): 250 m</td>
<td>Basement Penetration (m):</td>
</tr>
</tbody>
</table>

Do you need to use the conical side-entry sub (CSES) at this site?  
Yes [ ]  No [x]

Are high temperatures expected at this site?  
Yes [ ]  No [x]

Are there any other special requirements for logging at this site?  
Yes [ ]  No [x]

If “Yes” Please describe requirements: ____________________________

What do you estimate the total logging time for this site to be: __________

<table>
<thead>
<tr>
<th>Measurement Type</th>
<th>Scientific Objective</th>
<th>Relevance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutron-Porosity</td>
<td>Estimation of water content in sedimentary sequences.</td>
<td>3</td>
</tr>
<tr>
<td>Litho-Density</td>
<td>Estimation of water content, bulk density, and mineral composition in sedimentary sequences.</td>
<td>3</td>
</tr>
<tr>
<td>Natural Gamma Ray</td>
<td>Estimation of clay contents and mineral composition in sedimentary sequences.</td>
<td>1</td>
</tr>
<tr>
<td>Resistivity-Induction</td>
<td>Estimation of water content and electro-magnetic properties in sedimentary sequences.</td>
<td>1</td>
</tr>
<tr>
<td>Acoustic</td>
<td>Determination of in situ velocity and estimation of physical properties.</td>
<td>1</td>
</tr>
<tr>
<td>FMS</td>
<td>Imaging of sedimentary structures and fractures.</td>
<td>1</td>
</tr>
<tr>
<td>BHTV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistivity-Laterolog</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnetic/Susceptibility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Density-Neutron (LWD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resitivity-Gamma Ray (LWD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group at:  
borehole@ldeo.columbia.edu
http://www.ldeo.columbia.edu/BRG/brg_home.html
Phone/Fax: (914) 365-8674 / (914) 365-3182

Note: Sites with greater than 400 m of penetration or significant basement penetration require deployment of standard toolstrings.
**Form 4 – Pollution & Safety Hazard Summary**

Please fill out information in all gray boxes

<table>
<thead>
<tr>
<th>Proposal #: 605-full2</th>
<th>Site #: JS-4</th>
<th>Date Form Submitted: April 1st 2005</th>
</tr>
</thead>
</table>

1. **Summary of Operations at site:**
   (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)
   - Triple-APC to 100 mbsf, then double-APC to 200 mbsf. Double-XCB to 250 mbsf.

2. **Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:**

3. **From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits:**

4. **Are there any indications of gas hydrates at this location?**

5. **Are there reasons to expect hydrocarbon accumulations at this site? Please give details.**

6. **What “special” precautions will be taken during drilling?**

7. **What abandonment procedures do you plan to follow?**

8. **Please list other natural or manmade hazards which may effect ship’s operations:
   (e.g. ice, currents, cables)**
   - Typhoon (June to October)

9. **Summary: What do you consider the major risks in drilling at this site?**
**IODP Site Summary Forms:**

**Form 5 – Lithologic Summary**

<table>
<thead>
<tr>
<th>Sub-bottom depth (m)</th>
<th>Key reflectors, Unconformities, faults, etc</th>
<th>Age</th>
<th>Assumed velocity (km/sec)</th>
<th>Lithology</th>
<th>Paleo-environment</th>
<th>Avg. rate of sed. accum. (m/My)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>250</td>
<td></td>
<td>4 Ma</td>
<td>Hemipelagic clay to silt</td>
<td></td>
<td></td>
<td>70</td>
<td></td>
</tr>
</tbody>
</table>
Section A: Proposal Information

Onset and evolution of millennial-scale variability of Asian monsoon and its possible relation with Himalaya and Tibetan Plateau uplift

April 1st 2005

High-resolution reconstruction of dust flux as well as other paleoceanographic records in the southern part of Japan Sea during the last 4 m.y.

ODP Site 795 was conducted about 40 km northeast of this proposal site.

Section B: General Site Information

<table>
<thead>
<tr>
<th>Site Name: JS-5B</th>
<th>Area or Location: Northern Japan Basin, Japan Sea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latitude:</td>
<td>Jurisdiction: Japanese EEZ</td>
</tr>
<tr>
<td>Longitude:</td>
<td>Distance to Land: 130 km</td>
</tr>
<tr>
<td>Coordinates System: Other (Tokyo datum)</td>
<td>Water Depth: 3435 m</td>
</tr>
<tr>
<td>Priority of Site: Primary</td>
<td></td>
</tr>
</tbody>
</table>
### Section C: Operational Information

<table>
<thead>
<tr>
<th>Sediments</th>
<th>Basement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposed Penetration: 200 m</td>
<td>None</td>
</tr>
<tr>
<td>(m)</td>
<td></td>
</tr>
<tr>
<td>What is the total sed thickness? 800 m</td>
<td>Total Penetration: 200 m</td>
</tr>
</tbody>
</table>

#### General Lithologies:

| Diatomaceous clay to silt | None |

#### Coring Plan: (Specify or check)

<table>
<thead>
<tr>
<th>1-2-3-APC</th>
<th>VPC*</th>
<th>XCB</th>
<th>MDCB*</th>
<th>PCS</th>
<th>RCB</th>
<th>Re-entry</th>
<th>HRGR</th>
</tr>
</thead>
</table>

#### Wireline Logging Plan:

<table>
<thead>
<tr>
<th>Standard Tools</th>
<th>Special Tools</th>
<th>LWD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutron-Porosity</td>
<td>Borehole Televiewer</td>
<td></td>
</tr>
<tr>
<td>Litho-Density</td>
<td>Nuclear Magnetic Resonance</td>
<td></td>
</tr>
<tr>
<td>Gamma Ray</td>
<td>Geochemical</td>
<td></td>
</tr>
<tr>
<td>Resistivity</td>
<td>Side-Wall Core Sampling</td>
<td></td>
</tr>
<tr>
<td>Acoustic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formation Image</td>
<td>Others ( )</td>
<td>Others ( )</td>
</tr>
</tbody>
</table>

#### Max. Borehole Temp.:

**Expected value (For Riser Drilling)**

---
c

#### Mud Logging: (Riser Holes Only)

<table>
<thead>
<tr>
<th>Cuttings Sampling Intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td>from _______ m to _______ m, _______ m intervals</td>
</tr>
<tr>
<td>from _______ m to _______ m, _______ m intervals</td>
</tr>
</tbody>
</table>

**Basic Sampling Intervals: 5m**

#### Estimated days:

| Drilling/Coring: 2 days | Logging: 1 day | Total On-Site: 3 days |

#### Future Plan:

**Longterm Borehole Observation Plan/Re-entry Plan**

**Hazards/Weather:**

<table>
<thead>
<tr>
<th>Please check following List of Potential Hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shallow Gas</td>
</tr>
<tr>
<td>Hydrocarbon</td>
</tr>
<tr>
<td>Shallow Water Flow</td>
</tr>
<tr>
<td>Abnormal Pressure</td>
</tr>
<tr>
<td>Man-made Objects</td>
</tr>
<tr>
<td>H₂S</td>
</tr>
<tr>
<td>CO₂</td>
</tr>
<tr>
<td>Complicated Seabed Condition</td>
</tr>
<tr>
<td>Hydrothermal Activity</td>
</tr>
<tr>
<td>Soft Seabed</td>
</tr>
<tr>
<td>Currents</td>
</tr>
<tr>
<td>Fractured Zone</td>
</tr>
<tr>
<td>Fault</td>
</tr>
<tr>
<td>High Dip Angle</td>
</tr>
<tr>
<td>High Temperature</td>
</tr>
<tr>
<td>Landslide and Turbidity Current</td>
</tr>
<tr>
<td>Methane Hydrate</td>
</tr>
<tr>
<td>Diapir and Mud Slano</td>
</tr>
<tr>
<td>Ice Conditions</td>
</tr>
</tbody>
</table>

**What is your Weather window? (Preferable period with the reasons)**

**March to August**
<table>
<thead>
<tr>
<th>Data Type</th>
<th>SSP Requirements</th>
<th>Exists In DB</th>
<th>Details of available data and data that are still to be collected</th>
</tr>
</thead>
<tbody>
<tr>
<td>High resolution seismic reflection</td>
<td>Yes</td>
<td>Primary Line(s) GH773 line 77323a, 00:45 July 25 Crossing Lines(s): Location of Site on line (SP or Time only)</td>
<td></td>
</tr>
<tr>
<td>Deep Penetration seismic reflection</td>
<td></td>
<td>Primary Line(s): Location of Site on line (SP or Time only) Crossing Lines(s):</td>
<td></td>
</tr>
<tr>
<td>Seismic Velocity†</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seismic Grid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refraction (surface)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refraction (near bottom)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.5 kHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swath bathymetry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Side-looking sonar (surface)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Side-looking sonar (bottom)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Photography or Video</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heat Flow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnetics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gravity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sediment cores</td>
<td>Yes</td>
<td>GH95-1208</td>
<td></td>
</tr>
<tr>
<td>Rock sampling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water current data</td>
<td>Yes</td>
<td>JODC web page (<a href="http://www.jodc.go.jp">http://www.jodc.go.jp</a>)</td>
<td></td>
</tr>
<tr>
<td>Ice Conditions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OBS microseismicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Navigation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

X=required; X*=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.
### IODP Site Summary Forms:

<table>
<thead>
<tr>
<th>Proposal #: 605-full2</th>
<th>Site #: JS-5B</th>
<th>Date Form Submitted: April 1st 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Depth (m): 3435</td>
<td>Sed. Penetration (m): 200</td>
<td>Basement Penetration (m):</td>
</tr>
</tbody>
</table>

Do you need to use the conical side-entry sub (CSES) at this site?  Yes [ ]  No [ ]

Are high temperatures expected at this site?  Yes [ ]  No [ ]

Are there any other special requirements for logging at this site?  Yes [ ]  No [ ]

If “Yes” Please describe requirements: ________________________________

What do you estimate the total logging time for this site to be: _______________

<table>
<thead>
<tr>
<th>Measurement Type</th>
<th>Scientific Objective</th>
<th>Relevance (1-high, 3-Low)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutron-Porosity</td>
<td>Estimation of water content in sedimentary sequences.</td>
<td></td>
</tr>
<tr>
<td>Litho-Density</td>
<td>Estimation of water content, bulk density, and mineral composition in sedimentary sequences.</td>
<td></td>
</tr>
<tr>
<td>Natural Gamma Ray</td>
<td>Estimation of clay contents and mineral composition in sedimentary sequences.</td>
<td></td>
</tr>
<tr>
<td>Resistivity-Induction</td>
<td>Estimation of water content and electro-magnetic properties in sedimentary sequences.</td>
<td></td>
</tr>
<tr>
<td>Acoustic</td>
<td>Determination of in situ velocity and estimation of physical properties.</td>
<td></td>
</tr>
<tr>
<td>FMS</td>
<td>Imaging of sedimentary structures and fractures.</td>
<td></td>
</tr>
<tr>
<td>BHTV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistivity-Laterolog</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnetic/Susceptibility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Density-Neutron (LWD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistivity-Gamma Ray (LWD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group at: borehole@ldeo.columbia.edu http://www.ldeo.columbia.edu/BRG/brg_home.html Phone/Fax: (914) 365-8674 / (914) 365-3182

Note: Sites with greater than 400 m of penetration or significant basement penetration require deployment of standard toolstrings.
## IODP Site Summary Forms:

Please fill out information in all gray boxes

**Proposal #: 605-full2** | **Site #: JS-5B** | **Date Form Submitted: April 1st 2005**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Summary of Operations at site:</strong> (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)</td>
<td>Triple-APC to 100 mbsf, then double-APC to 200 mbsf.</td>
</tr>
<tr>
<td>2</td>
<td><strong>Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:</strong></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Are there any indications of gas hydrates at this location?</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Are there reasons to expect hydrocarbon accumulations at this site? Please give details.</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>What “special” precautions will be taken during drilling?</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>What abandonment procedures do you plan to follow:</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Please list other natural or manmade hazards which may effect ship’s operations: (e.g. ice, currents, cables)</td>
<td>Typhoon (June to October)</td>
</tr>
<tr>
<td>9</td>
<td><strong>Summary:</strong> What do you consider the major risks in drilling at this site?</td>
<td></td>
</tr>
</tbody>
</table>
IODP Site Summary Forms:

Form 5 – Lithologic Summary

Proposal #: 605-full2 | Site #: JS-5B | Date Form Submitted: April 1st 2005

<table>
<thead>
<tr>
<th>Sub-bottom depth (m)</th>
<th>Key reflectors, Unconformities, faults, etc</th>
<th>Age</th>
<th>Assumed velocity (km/sec)</th>
<th>Lithology</th>
<th>Paleo-environment</th>
<th>Avg. rate of sed. accum. (m/My)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td></td>
<td>4 Ma</td>
<td>Hemipelagic clay to silt</td>
<td></td>
<td></td>
<td>50</td>
<td></td>
</tr>
</tbody>
</table>
**Section A: Proposal Information**

**Title of Proposal:**
Onset and evolution of millennial-scale variability of Asian monsoon and its possible relation with Himalaya and Tibetan Plateau uplift

**Date Form Submitted:**
April 1st 2005

**Site Specific Objectives with Priority**
(Must include general objectives in proposal)

**List Previous Drilling in Area:**
ODP site 794, DSDP sites 299 and 302

---

**Section B: General Site Information**

**Site Name:**
JS-7B (ODP site 794)

**Latitude:**
Deg: 40N  Min: 11.4

**Longitude:**
Deg: 138E  Min: 13.9

**Coordinates System:**
WGS 84

**Priority of Site:**
Primary: Alt:

**Area or Location:**
Northern Yamato Basin, Japan Sea

**Jurisdiction:**
Japanese EEZ

**Distance to Land:**
70 km

**Water Depth:**
2811 m
### Section C: Operational Information

<table>
<thead>
<tr>
<th>Proposed Penetration: (m)</th>
<th>Sediments</th>
<th>Basement</th>
</tr>
</thead>
<tbody>
<tr>
<td>150 m</td>
<td>What is the total sed. thickness?</td>
<td>None</td>
</tr>
</tbody>
</table>

| General Lithologies: | Diatomaceous clay to silt | None |

| Coring Plan: (Specify or check) | 1-2-3-APC | VPC* | XCB | MDCB | PCS | RCB | Re-entry | HRGB | * Sections Currently Under Development |

<table>
<thead>
<tr>
<th>Wireline Logging Plan: Standard Tools</th>
<th>Special Tools</th>
<th>LWD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutron-Porosity</td>
<td>Borehole Televier</td>
<td>Formation Fluid Sampling</td>
</tr>
<tr>
<td>Litho-Density</td>
<td>Nuclear Magnetic Resonance</td>
<td>Borehole Temperature &amp; Pressure</td>
</tr>
<tr>
<td>Gamma Ray</td>
<td>Geochemical</td>
<td>Borehole Seismic</td>
</tr>
<tr>
<td>Resistivity</td>
<td>Side-Wall Core Sampling</td>
<td></td>
</tr>
<tr>
<td>Acoustic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formation Image</td>
<td>Others ( )</td>
<td>Others ( )</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Max. Borehole Temp.</th>
<th>Expected value (For Riser Drilling)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mud Logging: (Riser Holes Only)</th>
<th>Cuttings Sampling Intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>from _______ m to _______ m, _______ m intervals</td>
</tr>
<tr>
<td></td>
<td>from _______ m to _______ m, _______ m intervals</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Estimated days:</th>
<th>Future Plan:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drilling/Coring: 2 days</td>
<td>Logging: 1 day</td>
</tr>
<tr>
<td>Longterm Borehole Observation Plan/Re-entry Plan</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hazards/Weather:</th>
<th>Please check following List of Potential Hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shallow Gas</td>
<td>Complicated Seabed Condition</td>
</tr>
<tr>
<td>Hydrocarbon</td>
<td>Soft Seabed</td>
</tr>
<tr>
<td>Shallow Water Flow</td>
<td>Currents</td>
</tr>
<tr>
<td>Abnormal Pressure</td>
<td>Fractured Zone</td>
</tr>
<tr>
<td>Man-made Objects</td>
<td>Fault</td>
</tr>
<tr>
<td>H2S</td>
<td>High Dip Angle</td>
</tr>
<tr>
<td>CO2</td>
<td></td>
</tr>
</tbody>
</table>

What is your Weather window? (Preferable period with the reasons) | March to August
# IODP Site Summary Forms:

## Form 2 - Site Survey Detail

Please fill out information in all gray boxes

<table>
<thead>
<tr>
<th>Proposal #: 605-full2</th>
<th>Site #: JS-7B</th>
<th>Date Form Submitted: April 1st 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Data Type</strong></td>
<td><strong>SSP Requirements</strong></td>
<td><strong>Exists In DB</strong></td>
</tr>
<tr>
<td>1 High resolution seismic reflection</td>
<td>Yes</td>
<td>Primary Line(s) GH782, line 78214, 07:45, May 22 Crossing Lines(s): Location of Site on line (SP or Time only)</td>
</tr>
<tr>
<td>2 Deep Penetration seismic reflection</td>
<td></td>
<td>Primary Line(s): Location of Site on line (SP or Time only) Crossing Lines(s):</td>
</tr>
<tr>
<td>3 Seismic Velocity†</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Seismic Grid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5a Refraction (surface)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5b Refraction (near bottom)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 3.5 kHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Swath bathymetry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8a Side-looking sonar (surface)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8b Side-looking sonar (bottom)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Photography or Video</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Heat Flow</td>
<td>Yes</td>
<td>ODP site 794</td>
</tr>
<tr>
<td>11aMagnetics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11bGravity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 Sediment cores</td>
<td>Yes</td>
<td>ODP site 794</td>
</tr>
<tr>
<td>13 Rock sampling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14a Water current data</td>
<td>Yes</td>
<td>JODC web page (<a href="http://www.jodc.go.jp">http://www.jodc.go.jp</a>)</td>
</tr>
<tr>
<td>14b Ice Conditions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 OBS microseismicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 Navigation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 Other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SSP Classification of Site:**

**SSP Watchdog:**

**Date of Last Review:**

**SSP Comments:**

X=required; X*=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.
### IODP Site Summary Forms:

<table>
<thead>
<tr>
<th>Proposal #: 605-full2</th>
<th>Site #: JS-7B</th>
<th>Date Form Submitted: April 1st 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Depth (m): 2811</td>
<td>Sed. Penetration (m): 150</td>
<td>Basement Penetration (m):</td>
</tr>
</tbody>
</table>

- **Do you need to use the conical side-entry sub (CSES) at this site?** Yes [ ] No [x]
- **Are high temperatures expected at this site?** Yes [ ] No [x]
- **Are there any other special requirements for logging at this site?** Yes [ ] No [x]
  - If “Yes” Please describe requirements: ____________________________

What do you estimate the total logging time for this site to be: ____________

<table>
<thead>
<tr>
<th>Measurement Type</th>
<th>Scientific Objective</th>
<th>Relevance (1=high, 3=Low)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutron-Porosity</td>
<td>Estimation of water content in sedimentary sequences.</td>
<td>3</td>
</tr>
<tr>
<td>Litho-Density</td>
<td>Estimation of water content, bulk density, and mineral composition in sedimentary sequences.</td>
<td>3</td>
</tr>
<tr>
<td>Natural Gamma Ray</td>
<td>Estimation of clay contents and mineral composition in sedimentary sequences.</td>
<td>1</td>
</tr>
<tr>
<td>Resistivity-Induction</td>
<td>Estimation of water content and electro-magnetic properties in sedimentary sequences.</td>
<td>1</td>
</tr>
<tr>
<td>Acoustic</td>
<td>Determination of in situ velocity and estimation of physical properties.</td>
<td>1</td>
</tr>
<tr>
<td>FMS</td>
<td>Imaging of sedimentary structures and fractures.</td>
<td>1</td>
</tr>
<tr>
<td>BHTV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistivity-Laterolog</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnetic/Susceptibility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Density-Neutron (LWD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resitivity-Gamma Ray (LWD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group at: borehole@ldeo.columbia.edu http://www.ldeo.columbia.edu/BRG/brg_home.html Phone/Fax: (914) 365-8674 / (914) 365-3182

Note: Sites with greater than 400 m of penetration or significant basement penetration require deployment of standard toolstrings.
### Form 4 – Pollution & Safety Hazard Summary

**IODP Site Summary Forms:**  
Please fill out information in all gray boxes

<table>
<thead>
<tr>
<th>Proposal #: 605-full2</th>
<th>Site #: JS-7B</th>
<th>Date Form Submitted: April 1st 2005</th>
</tr>
</thead>
</table>
| 1 | **Summary of Operations at site:**  
(Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.) | Triple-APC to 100 mbsf, then double-APC to 150 mbsf. |
| 2 | Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock: | |
| 3 | From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits. | |
| 4 | Are there any indications of gas hydrates at this location? | |
| 5 | Are there reasons to expect hydrocarbon accumulations at this site? Please give details. | |
| 6 | What “special” precautions will be taken during drilling? | |
| 7 | What abandonment procedures do you plan to follow: | |
| 8 | Please list other natural or manmade hazards which may effect ship’s operations:  
(e.g. ice, currents, cables) | Typhoon (June to October) |
<p>| 9 | <strong>Summary: What do you consider the major risks in drilling at this site?</strong> | |</p>
<table>
<thead>
<tr>
<th>Sub-bottom depth (m)</th>
<th>Key reflectors, Unconformities, faults, etc</th>
<th>Age</th>
<th>Assumed velocity (km/sec)</th>
<th>Lithology</th>
<th>Paleo-environment</th>
<th>Avg. rate of sed. accum. (m/My)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td></td>
<td>4 Ma</td>
<td>Hemipelagic clay to silt</td>
<td></td>
<td></td>
<td>33</td>
<td></td>
</tr>
</tbody>
</table>
### Section A: Proposal Information

**Title of Proposal:**
Onset and evolution of millennial-scale variability of Asian monsoon and its possible relation with Himalaya and Tibetan Plateau uplift

**Date Form Submitted:**
April 1st 2005

**Site Specific Objectives with Priority**
High-resolution reconstruction of dust flux as well as other paleoceanographic records in the southern part of Japan Sea during the last 4 m.y.

**List Previous Drilling in Area:**
ODP Site 797

### Section B: General Site Information

**Site Name:**
JS-9 (ODP Site 797)

<table>
<thead>
<tr>
<th>Coordinates System</th>
<th>WGS 84</th>
</tr>
</thead>
</table>

**Latitude:**
Deg: 38N  Min: 37

**Longitude:**
Deg: 134E Min: 32

**Priority of Site:**
Primary: Alt:

**Area or Location:**
Yamato Basin, Japan Sea

**Jurisdiction:**
Japanese EEZ

**Distance to Land:**
220 km

**Water Depth:**
2874 m
## Section C: Operational Information

<table>
<thead>
<tr>
<th>Proposed Penetration: (m)</th>
<th>Sediments</th>
<th>Basement</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 m</td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>General Lithologies:</th>
<th>Diatomaceous clay to silt</th>
<th>None</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Coring Plan: (Specify or check)</th>
<th>1-2-3-APC</th>
<th>VPC*</th>
<th>XCB</th>
<th>MDCB*</th>
<th>PCS</th>
<th>RCB</th>
<th>Re-entry</th>
<th>HRGB*</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Wireline Logging Plan:</th>
<th>Neutron-Porosity</th>
<th>Borehole Televiewer</th>
<th>Formation Fluid Sampling</th>
<th>Density-Neutron</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Litho-Density</td>
<td>Nuclear Magnetic Resonance</td>
<td>Borehole Temperature &amp; Pressure</td>
<td>Resistivity-Gamma</td>
</tr>
<tr>
<td></td>
<td>Gamma Ray</td>
<td>Geochemical</td>
<td>Borehole Seismic</td>
<td>Acoustic</td>
</tr>
<tr>
<td></td>
<td>Resistivity</td>
<td>Side-Wall Core Sampling</td>
<td>Others ( )</td>
<td>Others ( )</td>
</tr>
<tr>
<td></td>
<td>Acoustic</td>
<td>Formation Image</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Max Borehole Temp. :</th>
<th>Expected value (For Riser Drilling)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Mud Logging: (Riser Holes Only)</th>
<th>Cuttings Sampling Intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>from _____ m to _____ m, _____ m intervals</td>
</tr>
<tr>
<td></td>
<td>from _____ m to _____ m, _____ m intervals</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Estimated days:</th>
<th>Drilling/Coring: 2 days</th>
<th>Logging: 1 day</th>
<th>Total On-Site: 3 days</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Future Plan:</th>
<th>Longterm Borehole Observation Plan/Re-entry Plan</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Hazards/Weather:</th>
<th>Please check following List of Potential Hazards</th>
<th>What is your Weather window? (Preferable period with the reasons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shallow Gas</td>
<td>Complicated Seabed Condition</td>
<td>March to August</td>
</tr>
<tr>
<td>Hydrocarbon</td>
<td>Soft Seabed</td>
<td></td>
</tr>
<tr>
<td>Shallow Water Flow</td>
<td>Currents</td>
<td>Hydrothermal Activity</td>
</tr>
<tr>
<td>Abnormal Pressure</td>
<td>Fractured Zone</td>
<td>Landslide and Turbidity Current</td>
</tr>
<tr>
<td>Man-made Objects</td>
<td>Fault</td>
<td>Methane Hydrate</td>
</tr>
<tr>
<td>H₂S</td>
<td>High Dip Angle</td>
<td>Diapir and Mud Volcano</td>
</tr>
<tr>
<td>CO₂</td>
<td></td>
<td>High Temperature</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ice Conditions</td>
</tr>
</tbody>
</table>

---

*Sections Currently Under Development*
# IODP Site Summary Forms:

Please fill out information in all gray boxes

<table>
<thead>
<tr>
<th>Proposal #: 605-full2</th>
<th>Site #: JS-9</th>
<th>Date Form Submitted: April 1st 2005</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Data Type</th>
<th>SSP Requirements</th>
<th>Exists In DB</th>
<th>Details of available data and data that are still to be collected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. High resolution seismic reflection</td>
<td>Yes</td>
<td>Primary Line(s): GH782, line 78237a, 03:30 April 30 Crossing Lines(s): Location of Site on line (SP or Time only)</td>
<td></td>
</tr>
<tr>
<td>2. Deep Penetration seismic reflection</td>
<td></td>
<td>Primary Line(s): Location of Site on line (SP or Time only) Crossing Lines(s):</td>
<td></td>
</tr>
<tr>
<td>3. Seismic Velocity†</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Seismic Grid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5a. Refraction (surface)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5b. Refraction (near bottom)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. 3.5 kHz</td>
<td>Yes</td>
<td>GH782, line 78237a, 03:30 April 30 Location of Site on line (Time)</td>
<td></td>
</tr>
<tr>
<td>7. Swath bathymetry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8a. Side-looking sonar (surface)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8b. Side-looking sonar (bottom)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Photography or Video</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Heat Flow</td>
<td>Yes</td>
<td>ODP site 797</td>
<td></td>
</tr>
<tr>
<td>11a. Magnetics</td>
<td>Yes</td>
<td>Compiled map published from Geological Survey of Japan</td>
<td></td>
</tr>
<tr>
<td>11b. Gravity</td>
<td>Yes</td>
<td>Compiled map published from Geological Survey of Japan</td>
<td></td>
</tr>
<tr>
<td>12. Sediment cores</td>
<td>Yes</td>
<td>ODP site 797</td>
<td></td>
</tr>
<tr>
<td>13. Rock sampling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14a. Water current data</td>
<td>Yes</td>
<td>JODC web page (<a href="http://www.jodc.go.jp">http://www.jodc.go.jp</a>)</td>
<td></td>
</tr>
<tr>
<td>14b. Ice Conditions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. OBS microseismicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Other</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SSP Classification of Site: | SSP Watchdog: | Date of Last Review: |
SSP Comments: |

X=required; X*=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.
## IODP Site Summary Forms:

<table>
<thead>
<tr>
<th>Proposal #: 605-full2</th>
<th>Site #: JS-9</th>
<th>Date Form Submitted: April 1st 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Depth (m): 2874 m</td>
<td>Sed. Penetration (m): 200 m</td>
<td>Basement Penetration (m):</td>
</tr>
</tbody>
</table>

- **Do you need to use the conical side-entry sub (CSES) at this site?** Yes [ ] No [ ]
- **Are high temperatures expected at this site?** Yes [ ] No [ ]
- **Are there any other special requirements for logging at this site?** Yes [ ] No [ ]
  If “Yes” Please describe requirements: ____________________________

What do you estimate the total logging time for this site to be: ____________

<table>
<thead>
<tr>
<th>Measurement Type</th>
<th>Scientific Objective</th>
<th>Relevance (1=high, 3=Low)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutron-Porosity</td>
<td>Estimation of water content in sedimentary sequences.</td>
<td>3</td>
</tr>
<tr>
<td>Litho-Density</td>
<td>Estimation of water content, bulk density, and mineral composition in sedimentary sequences.</td>
<td>3</td>
</tr>
<tr>
<td>Natural Gamma Ray</td>
<td>Estimation of clay contents and mineral composition in sedimentary sequences.</td>
<td>1</td>
</tr>
<tr>
<td>Resistivity-Induction</td>
<td>Estimation of water content and electro-magnetic properties in sedimentary sequences.</td>
<td>1</td>
</tr>
<tr>
<td>Acoustic</td>
<td>Determination of in situ velocity and estimation of physical properties.</td>
<td>1</td>
</tr>
<tr>
<td>FMS</td>
<td>Imaging of sedimentary structures and fractures.</td>
<td>1</td>
</tr>
<tr>
<td>BHTV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistivity-Laterolog</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnetic/Susceptibility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Density-Neutron (LWD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistivity-Gamma Ray (LWD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group at:
 borehole@ldeo.columbia.edu  
http://www.ldeo.columbia.edu/BRG/brg_home.html  
Phone/Fax: (914) 365-8674 / (914) 365-3182

Note: Sites with greater than 400 m of penetration or significant basement penetration require deployment of standard toolstrings.
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td><strong>Summary of Operations at site:</strong> (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)</td>
<td><strong>Triple-APC to 100 mbsf, then double-APC to 200 mbsf.</strong></td>
</tr>
<tr>
<td><strong>2</strong></td>
<td>Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:</td>
<td></td>
</tr>
<tr>
<td><strong>3</strong></td>
<td>From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.</td>
<td></td>
</tr>
<tr>
<td><strong>4</strong></td>
<td>Are there any indications of gas hydrates at this location?</td>
<td></td>
</tr>
<tr>
<td><strong>5</strong></td>
<td>Are there reasons to expect hydrocarbon accumulations at this site? Please give details.</td>
<td></td>
</tr>
<tr>
<td><strong>6</strong></td>
<td>What “special” precautions will be taken during drilling?</td>
<td></td>
</tr>
<tr>
<td><strong>7</strong></td>
<td>What abandonment procedures do you plan to follow:</td>
<td></td>
</tr>
<tr>
<td><strong>8</strong></td>
<td>Please list other natural or manmade hazards which may effect ship’s operations: (e.g. ice, currents, cables)</td>
<td><strong>Typhoon (June to October)</strong></td>
</tr>
<tr>
<td><strong>9</strong></td>
<td>Summary: What do you consider the major risks in drilling at this site?</td>
<td></td>
</tr>
</tbody>
</table>
### Form 5 – Lithologic Summary

IODP Site Summary Forms:

<table>
<thead>
<tr>
<th>Proposal #: 605-full2</th>
<th>Site #: JS-9</th>
<th>Date Form Submitted: April 1st 2005</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Sub-bottom depth (m)</th>
<th>Key reflectors, Unconformities, faults, etc</th>
<th>Age</th>
<th>Assumed velocity (km/sec)</th>
<th>Lithology</th>
<th>Paleo-environment</th>
<th>Avg. rate of sed. accum. (m/My)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td></td>
<td>4 Ma</td>
<td>Hemipelagic clay to silt</td>
<td></td>
<td></td>
<td>50</td>
<td></td>
</tr>
</tbody>
</table>
**Section A: Proposal Information**

<table>
<thead>
<tr>
<th>Title of Proposal</th>
<th>Onset and evolution of millennial-scale variability of Asian monsoon and its possible relation with Himalaya and Tibetan Plateau uplift</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Form Submitted</td>
<td>April 1st 2005</td>
</tr>
<tr>
<td>Site Specific Objectives with Priority</td>
<td>High-resolution reconstruction of dust flux as well as other paleoceanographic records in the southern part of Japan Sea during the last 2 m.y.</td>
</tr>
<tr>
<td>List Previous Drilling in Area</td>
<td>ODP site 798</td>
</tr>
</tbody>
</table>

---

**Section B: General Site Information**

<table>
<thead>
<tr>
<th>Site Name: JS-10B</th>
<th>If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #</th>
<th>Area or Location: off Tottori, Japan Sea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latitude:</td>
<td>D: 35N Min: 57.6</td>
<td>Jurisdiction: Japanese EEZ</td>
</tr>
<tr>
<td>Longitude:</td>
<td>D: 134E Min: 26.0</td>
<td>Distance to Land: 50 km</td>
</tr>
<tr>
<td>Coordinates System:</td>
<td>Other (Tokyo datum)</td>
<td>Water Depth: 316 m</td>
</tr>
<tr>
<td>Priority of Site:</td>
<td>Primary: Alt:</td>
<td></td>
</tr>
</tbody>
</table>
### Section C: Operational Information

<table>
<thead>
<tr>
<th>Proposed Penetration:</th>
<th>Sediments</th>
<th>Basement</th>
</tr>
</thead>
<tbody>
<tr>
<td>(m)</td>
<td>500 m</td>
<td>None</td>
</tr>
<tr>
<td>What is the total sed. thickness?</td>
<td>1500 m</td>
<td></td>
</tr>
<tr>
<td>Total Penetration:</td>
<td>500 m</td>
<td></td>
</tr>
</tbody>
</table>

#### General Lithologies:

<table>
<thead>
<tr>
<th>Lithology</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diatomaceous clay to silt</td>
<td>None</td>
</tr>
</tbody>
</table>

#### Coring Plan:

<table>
<thead>
<tr>
<th>Plan</th>
<th>1-2-3-APC</th>
<th>VPC</th>
<th>XCB</th>
<th>MDCT</th>
<th>PCS</th>
<th>RCB</th>
<th>Re-entry</th>
<th>HRGC</th>
</tr>
</thead>
</table>

#### Wireline Logging Plan:

<table>
<thead>
<tr>
<th>Standard Tools</th>
<th>Special Tools</th>
<th>LWD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutron-Porosity</td>
<td>Borehole Televiwer</td>
<td>Density-Neutron</td>
</tr>
<tr>
<td>Litho-Density</td>
<td>Nuclear Magnetic Resonance</td>
<td>Borehole Temperature &amp; Pressure</td>
</tr>
<tr>
<td>Gamma Ray</td>
<td>Geochemical</td>
<td>Borehole Seismic</td>
</tr>
<tr>
<td>Resistivity</td>
<td>Side-Wall Core Sampling</td>
<td>Acoustic</td>
</tr>
<tr>
<td>Acoustic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formation Image</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Max. Borehole Temp. :</th>
<th>Expected value (For Riser Drilling)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>G°C</td>
</tr>
</tbody>
</table>

#### Mud Logging:

- Cuttings Sampling Intervals:
  - from [ ] m to [ ] m, [ ] m intervals
  - from [ ] m to [ ] m, [ ] m intervals

- Basic Sampling Intervals: 5m

#### Estimated days:

- Drilling/Coring: 4 days
- Logging: 3 day
- Total On-Site: 7 days

#### Future Plan:

*Longterm Borehole Observation Plan/Re-entry Plan*

#### Hazards/Weather:

*Please check following List of Potential Hazards*

- Shallow Gas
- Hydrocarbon
- Shallow Water Flow
- Abnormal Pressure
- Man-made Objects
- H₂S
- CO₂

- Complicated Seabed Condition
- Soft Seabed
- Currents
- Fractured Zone
- Fault
- High Dip Angle

- Hydrothermal Activity
- Landslide and Turbidity Current
- Methane Hydrate
- Diapir and Mud Volcano
- High Temperature
- Ice Conditions

*What is your Weather window? (Preferable period with the reasons)*

March to August
# IODP Site Summary Forms:

Please fill out information in all gray boxes

| Proposal #: 605-full2 | Site #: JS-10B | Date Form Submitted: April 1st 2005 |

<table>
<thead>
<tr>
<th>Data Type</th>
<th>SSP Requirements</th>
<th>Exists In DB</th>
<th>Details of available data and data that are still to be collected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>High resolution seismic reflection</td>
<td>Yes</td>
<td>GH782, line 78243, 22:15, April 23 (Location of Site on line (SP or Time only))</td>
</tr>
<tr>
<td>2</td>
<td>Deep Penetration seismic reflection</td>
<td>Yes</td>
<td>Primary Line(s): Crossing Lines(s): (Location of Site on line (SP or Time only))</td>
</tr>
<tr>
<td>3</td>
<td>Seismic Velocity†</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Seismic Grid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5a</td>
<td>Refraction (surface)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5b</td>
<td>Refraction (near bottom)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>3.5 kHz</td>
<td>Yes</td>
<td>GH782, line 78243, 22:15, April 23</td>
</tr>
<tr>
<td>7</td>
<td>Swath bathymetry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8a</td>
<td>Side-looking sonar (surface)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8b</td>
<td>Side-looking sonar (bottom)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Photography or Video</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Heat Flow</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11a</td>
<td>Magnetics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11b</td>
<td>Gravity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Sediment cores</td>
<td>Yes</td>
<td>GH872-308</td>
</tr>
<tr>
<td>13</td>
<td>Rock sampling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14a</td>
<td>Water current data</td>
<td>Yes</td>
<td>JODC web page (<a href="http://www.jodc.go.jp">http://www.jodc.go.jp</a>)</td>
</tr>
<tr>
<td>14b</td>
<td>Ice Conditions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>OBS microseismicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Navigation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SSP Classification of Site:  | SSP Watchdog:  | Date of Last Review:  |

SSP Comments:

X=required; X*=may be required for specific sites; Y=recommended; Y*=may be recommended for specific sites; 
R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.
**Form 3 - Detailed Logging Plan**

**IODP Site Summary Forms:**

<table>
<thead>
<tr>
<th>Proposal #: 605-full2</th>
<th>Site #: JS-10B</th>
<th>Date Form Submitted: April 1st 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Depth (m): 316</td>
<td>Sed. Penetration (m): 500</td>
<td>Basement Penetration (m):</td>
</tr>
</tbody>
</table>

Do you need to use the conical side-entry sub (CSES) at this site? [ ] Yes [ ] No
Are high temperatures expected at this site? [ ] Yes [ ] No
Are there any other special requirements for logging at this site? [ ] Yes [ ] No
   If “Yes” Please describe requirements: ____________________________

What do you estimate the total logging time for this site to be: ____________

<table>
<thead>
<tr>
<th>Measurement Type</th>
<th>Scientific Objective</th>
<th>Relevance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutron-Porosity</td>
<td>Estimation of water content in sedimentary sequences.</td>
<td>3</td>
</tr>
<tr>
<td>Litho-Density</td>
<td>Estimation of water content, bulk density, and mineral composition in sedimentary sequences.</td>
<td>3</td>
</tr>
<tr>
<td>Natural Gamma Ray</td>
<td>Estimation of clay contents and mineral composition in sedimentary sequences.</td>
<td>1</td>
</tr>
<tr>
<td>Resistivity-Induction</td>
<td>Estimation of water content and electro-magnetic properties in sedimentary sequences.</td>
<td>1</td>
</tr>
<tr>
<td>Acoustic</td>
<td>Determination of in situ velocity and estimation of physical properties.</td>
<td>1</td>
</tr>
<tr>
<td>FMS</td>
<td>Imaging of sedimentary structures and fractures.</td>
<td>1</td>
</tr>
<tr>
<td>BHTV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistivity-Laterolog</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnetic/Susceptibility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Density-Neutron (LWD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resitivity-Gamma Ray</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(LWD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group at:
bosehole@ldeo.columbia.edu
http://www.ldeo.columbia.edu/BRG/brg_home.html
Phone/Fax: (914) 365-8674 / (914) 365-3182

Note: Sites with greater than 400 m of penetration or significant basement penetration require deployment of standard toolstrings.
### IODP Site Summary Forms:

**Form 4 – Pollution & Safety Hazard Summary**

Please fill out information in all gray boxes

<table>
<thead>
<tr>
<th>Proposal #: 605-full2</th>
<th>Site #: JS-10B</th>
<th>Date Form Submitted: April 1st 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)</td>
<td>Triple-APC to 100 mbsf, then double-APC to 200 mbsf. Double-XCB to 500 mbsf.</td>
<td></td>
</tr>
<tr>
<td>2. Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Are there any indications of gas hydrates at this location?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Are there reasons to expect hydrocarbon accumulations at this site? Please give details.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. What “special” precautions will be taken during drilling?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. What abandonment procedures do you plan to follow:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Please list other natural or manmade hazards which may effect ship’s operations: (e.g. ice, currents, cables)</td>
<td>Typhoon (June to October)</td>
<td></td>
</tr>
<tr>
<td>9. Summary: What do you consider the major risks in drilling at this site?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# IODP Site Summary Forms:

## Form 5 – Lithologic Summary

<table>
<thead>
<tr>
<th>Proposal #: 605-full2</th>
<th>Site #: JS-10B</th>
<th>Date Form Submitted: April 1st 2005</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Sub-bottom depth (m)</th>
<th>Key reflectors, Unconformities, faults, etc</th>
<th>Age</th>
<th>Assumed velocity (km/sec)</th>
<th>Lithology</th>
<th>Paleo-environment</th>
<th>Avg. rate of sed. accum. (m/My)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td></td>
<td>2 Ma</td>
<td>Hemipelagic clay to silt</td>
<td></td>
<td></td>
<td>230</td>
<td></td>
</tr>
</tbody>
</table>
# IODP Site Summary Forms:
## Form 1 - General Site Information

**Section A: Proposal Information**

<table>
<thead>
<tr>
<th>Field</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title of Proposal</td>
<td>Onset and evolution of millennial-scale variability of Asian monsoon and its possible relation with Himalaya and Tibetan Plateau uplift</td>
</tr>
<tr>
<td>Date Form Submitted</td>
<td>April 1st 2005</td>
</tr>
<tr>
<td>Site Specific Objectives with Priority</td>
<td>High-resolution reconstruction of dust flux as well as other paleoceanographic records in the southern part of Japan Sea during the last 5 m.y.</td>
</tr>
<tr>
<td>List Previous Drilling in Area</td>
<td></td>
</tr>
</tbody>
</table>

**Section B: General Site Information**

<table>
<thead>
<tr>
<th>Field</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Site Name:</strong></td>
<td><strong>JS-11</strong></td>
</tr>
<tr>
<td><strong>Site Name:</strong></td>
<td><strong>JS-11</strong></td>
</tr>
<tr>
<td>(e.g. SWPAC-01A)</td>
<td>If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #</td>
</tr>
<tr>
<td><strong>Latitude:</strong></td>
<td><strong>37N</strong></td>
</tr>
<tr>
<td><strong>Min:</strong></td>
<td>31</td>
</tr>
<tr>
<td><strong>Longitude:</strong></td>
<td><strong>130E</strong></td>
</tr>
<tr>
<td><strong>Min:</strong></td>
<td>20</td>
</tr>
<tr>
<td><strong>Coordinates System:</strong></td>
<td>WGS 84</td>
</tr>
<tr>
<td><strong>Priority of Site:</strong></td>
<td>Primary</td>
</tr>
<tr>
<td><strong>Area or Location:</strong></td>
<td>South Korean Plateau, Japan Sea</td>
</tr>
<tr>
<td><strong>Jurisdiction:</strong></td>
<td>Korean EEZ</td>
</tr>
<tr>
<td><strong>Distance to Land:</strong></td>
<td>100 km</td>
</tr>
<tr>
<td><strong>Water Depth:</strong></td>
<td>1620 m</td>
</tr>
</tbody>
</table>
### Section C: Operational Information

<table>
<thead>
<tr>
<th>Proposed Penetration: 250 m</th>
<th>Sediments</th>
<th>Basement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Diatomaceous clay to silt</td>
<td>None</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>General Lithologies:</th>
<th>1-2-3-APC</th>
<th>VPC</th>
<th>XCB</th>
<th>MDCB</th>
<th>PCS</th>
<th>RCB</th>
<th>Re-entry</th>
<th>HRGB</th>
<th>Total Penetration: 250 m</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Coring Plan: (Specify or check)</th>
<th>Standard Tools</th>
<th>Special Tools</th>
<th>LWD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Neutron-Porosity</td>
<td>Borehole Televiwer</td>
<td>Formation Fluid Sampling</td>
</tr>
<tr>
<td></td>
<td>Litho-Density</td>
<td>Nuclear Magnetic Resonance</td>
<td>Borehole Temperature &amp; Pressure</td>
</tr>
<tr>
<td></td>
<td>Gamma Ray</td>
<td>Geochemical</td>
<td>Borehole Seismic</td>
</tr>
<tr>
<td></td>
<td>Resistivity</td>
<td>Side-Wall Core Sampling</td>
<td>Acoustic</td>
</tr>
<tr>
<td></td>
<td>Acoustic</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Formation Image</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Others ( )</td>
<td>Others ( )</td>
</tr>
</tbody>
</table>

| Max. Borehole Temp. | 5°C |

<table>
<thead>
<tr>
<th>Mud Logging: (Riser Holes Only)</th>
<th>Cuttings Sampling Intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>from _____ m to _____ m, _____ m intervals</td>
</tr>
<tr>
<td></td>
<td>from _____ m to _____ m, _____ m intervals</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Estimated days:</th>
<th>Drilling/Coring: 3 days</th>
<th>Logging: 1 day</th>
<th>Total On-Site: 4 days</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Future Plan:</th>
<th>Longterm Borehole Observation Plan/Re-entry Plan</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Hazards/Weather:</th>
<th>Please check following List of Potential Hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Shallow Gas</td>
</tr>
<tr>
<td></td>
<td>Hydrocarbon</td>
</tr>
<tr>
<td></td>
<td>Shallow Water Flow</td>
</tr>
<tr>
<td></td>
<td>Abnormal Pressure</td>
</tr>
<tr>
<td></td>
<td>Man-made Objects</td>
</tr>
<tr>
<td></td>
<td>H2S</td>
</tr>
<tr>
<td></td>
<td>CO2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What is your Weather window? (Preferable period with the reasons)</th>
<th>March to August</th>
</tr>
</thead>
</table>
## IODP Site Summary Forms:

Please fill out information in all gray boxes

### Form 2 - Site Survey Detail

**Proposal #: 605-full2**

<table>
<thead>
<tr>
<th>Data Type</th>
<th>SSP Requirements</th>
<th>Exists in DB</th>
<th>Details of available data and data that are still to be collected</th>
</tr>
</thead>
<tbody>
<tr>
<td>High resolution seismic reflection</td>
<td>Yes</td>
<td></td>
<td>Primary Line(s): Published Chip profiles from National Oceanographic Research Institute of Korea</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Location of Site on line (SP or Time only)</td>
</tr>
<tr>
<td>Deep Penetration seismic reflection</td>
<td></td>
<td></td>
<td>Primary Line(s): Unpublished profile from Korea Institute of Geoscience and Mineral Resources</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Location of Site on line (SP or Time only)</td>
</tr>
<tr>
<td>Seismic Velocity</td>
<td></td>
<td></td>
<td>Unpublished profile from Korea National Oil Corporation</td>
</tr>
<tr>
<td>Seismic Grid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refraction (surface)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refraction (near bottom)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.5 kHz</td>
<td></td>
<td></td>
<td>Location of Site on line (Time)</td>
</tr>
<tr>
<td>Swath bathymetry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Side-looking sonar (surface)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Side-looking sonar (bottom)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Photography or Video</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heat Flow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnetics</td>
<td>Yes</td>
<td></td>
<td>Compiled map published from National Oceanographic Research Institute of Korea</td>
</tr>
<tr>
<td>Gravity</td>
<td>Yes</td>
<td></td>
<td>Compiled map published from National Oceanographic Research Institute of Korea</td>
</tr>
<tr>
<td>Sediment cores</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rock sampling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water current data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ice Conditions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OBS microseismicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Navigation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SSP Classification of Site:**

**SSP Watchdog:**

**Date of Last Review:**

**SSP Comments:**

X = required; X* = may be required for specific sites; Y = recommended; Y* = may be recommended for specific sites; 
R = required for re-entry sites; T = required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.
IODEP Site Summary Forms:

<table>
<thead>
<tr>
<th>Proposal #: 605-full2</th>
<th>Site #: JS-11</th>
<th>Date Form Submitted: April 1st 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Depth (m): 1620</td>
<td>Sed. Penetration (m): 250</td>
<td>Basement Penetration (m):</td>
</tr>
</tbody>
</table>

Do you need to use the conical side-entry sub (CSES) at this site? □ Yes □ No
Are high temperatures expected at this site? □ Yes □ No
Are there any other special requirements for logging at this site? □ Yes □ No

If “Yes” Please describe requirements:

What do you estimate the total logging time for this site to be: ____________

<table>
<thead>
<tr>
<th>Measurement Type</th>
<th>Scientific Objective</th>
<th>Relevance (1=high, 3=Low)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutron-Porosity</td>
<td>Estimation of water content in sedimentary sequences.</td>
<td>3</td>
</tr>
<tr>
<td>Litho-Density</td>
<td>Estimation of water content, bulk density, and mineral composition in sedimentary sequences.</td>
<td>3</td>
</tr>
<tr>
<td>Natural Gamma Ray</td>
<td>Estimation of clay contents and mineral composition in sedimentary sequences.</td>
<td>1</td>
</tr>
<tr>
<td>Resistivity-Induction</td>
<td>Estimation of water content and electro-magnetic properties in sedimentary sequences.</td>
<td>1</td>
</tr>
<tr>
<td>Acoustic</td>
<td>Determination of in situ velocity and estimation of physical properties.</td>
<td>1</td>
</tr>
<tr>
<td>FMS</td>
<td>Imaging of sedimentary structures and fractures.</td>
<td>1</td>
</tr>
<tr>
<td>BHTV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistivity-Laterolog</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnetic/Susceptibility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Density-Neutron (LWD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistivity-Gamma Ray</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(LWD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group at: borehole@ldeo.columbia.edu http://www.ldeo.columbia.edu/BRG/brg_home.html Phone/Fax: (914) 365-8674 / (914) 365-3182

Note: Sites with greater than 400 m of penetration or significant basement penetration require deployment of standard toolstrings.
## IODP Site Summary Forms:

**Proposal #: 605-full2** | **Site #: JS-11** | **Date Form Submitted: April 1st 2005**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td>Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)</td>
<td>Triple-APC to 100 mbsf, then double-APC to 200 mbsf. Double-XCB to 250 mbsf.</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td>Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:</td>
<td></td>
</tr>
<tr>
<td><strong>3</strong></td>
<td>From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.</td>
<td></td>
</tr>
<tr>
<td><strong>4</strong></td>
<td>Are there any indications of gas hydrates at this location?</td>
<td></td>
</tr>
<tr>
<td><strong>5</strong></td>
<td>Are there reasons to expect hydrocarbon accumulations at this site? Please give details.</td>
<td></td>
</tr>
<tr>
<td><strong>6</strong></td>
<td>What “special” precautions will be taken during drilling?</td>
<td></td>
</tr>
<tr>
<td><strong>7</strong></td>
<td>What abandonment procedures do you plan to follow:</td>
<td></td>
</tr>
<tr>
<td><strong>8</strong></td>
<td>Please list other natural or manmade hazards which may effect ship’s operations: (e.g. ice, currents, cables)</td>
<td>Typhoon (June to October)</td>
</tr>
<tr>
<td><strong>9</strong></td>
<td>Summary: What do you consider the major risks in drilling at this site?</td>
<td></td>
</tr>
</tbody>
</table>
# IODP Site Summary Forms:

## Form 5 – Lithologic Summary

<table>
<thead>
<tr>
<th>Proposal #: 605-full2</th>
<th>Site #: JS-11</th>
<th>Date Form Submitted: April 1st 2005</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Sub-bottom depth (m)</th>
<th>Key reflectors, Unconformities, faults, etc</th>
<th>Age</th>
<th>Assumed velocity (km/sec)</th>
<th>Lithology</th>
<th>Paleo-environment</th>
<th>Avg. rate of sed. accum. (m/My)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>250</td>
<td></td>
<td>5 Ma</td>
<td>Hemipelagic clay to silt</td>
<td></td>
<td></td>
<td>50</td>
<td></td>
</tr>
</tbody>
</table>
**Section A: Proposal Information**

<table>
<thead>
<tr>
<th>Title of Proposal:</th>
<th>Onset and evolution of millennial-scale variability of Asian monsoon and its possible relation with Himalaya and Tibetan Plateau uplift</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Form Submitted:</td>
<td>April 1st 2005</td>
</tr>
<tr>
<td>Site Specific Objectives with Priority (Must include general objectives in proposal):</td>
<td>High-resolution reconstruction of dust flux as well as other paleoceanographic records in the southern part of East China Sea during the last 5 m.y.</td>
</tr>
<tr>
<td>List Previous Drilling in Area:</td>
<td></td>
</tr>
</tbody>
</table>

**Section B: General Site Information**

<table>
<thead>
<tr>
<th>Site Name: ECS-1</th>
<th>If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #</th>
</tr>
</thead>
<tbody>
<tr>
<td>(e.g. SWPAC-01A)</td>
<td>Danjo Basin, East China Sea</td>
</tr>
<tr>
<td>Latitude:</td>
<td>Deg: 31N, Min: 38.3</td>
</tr>
<tr>
<td>Longitude:</td>
<td>Deg: 128E, Min: 56.6</td>
</tr>
<tr>
<td>Coordinates System:</td>
<td>WGS 84</td>
</tr>
<tr>
<td>Priority of Site:</td>
<td>Primary: Alt:</td>
</tr>
<tr>
<td>Area or Location:</td>
<td></td>
</tr>
<tr>
<td>Jurisdiction:</td>
<td>Japanese EEZ</td>
</tr>
<tr>
<td>Distance to Land:</td>
<td>50 km</td>
</tr>
<tr>
<td>Water Depth:</td>
<td>746 m</td>
</tr>
</tbody>
</table>

605-Full2
# Section C: Operational Information

<table>
<thead>
<tr>
<th>Proposed Penetration: (m)</th>
<th>Sediments</th>
<th>Basement</th>
</tr>
</thead>
<tbody>
<tr>
<td>500 m</td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>

What is the total sed. thickness? / >900 m

Total Penetration: 500 m

<table>
<thead>
<tr>
<th>General Lithologies:</th>
<th>Diatomaceous clay to silt</th>
<th>None</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Coring Plan: (Specify or check)</th>
<th>Standard Tools</th>
<th>Special Tools</th>
<th>LWD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2-3-APC</td>
<td>Neutron-Porosity</td>
<td>Borehole Televiwer</td>
<td>Formation Fluid Sampling</td>
</tr>
<tr>
<td></td>
<td>Litho-Density</td>
<td>Nuclear Magnetic Resonance</td>
<td>Borehole Temperature &amp; Pressure</td>
</tr>
<tr>
<td></td>
<td>Gamma Ray</td>
<td>Geochemical</td>
<td>Borehole Seismic</td>
</tr>
<tr>
<td></td>
<td>Resistivity</td>
<td>Side-Wall Core Sampling</td>
<td>Acoustic</td>
</tr>
<tr>
<td></td>
<td>Acoustic</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Formation Image</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Max. Borehole Temp.:

Expected value (For Riser Drilling)

---

<table>
<thead>
<tr>
<th>Mud Logging: (Riser Holes Only)</th>
<th>Cuttings Sampling Intervals</th>
<th>Basic Sampling Intervals: 5m</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>from m to m, m intervals</td>
<td>from m to m, m intervals</td>
</tr>
</tbody>
</table>

Estimated days:

Drilling/Coring: 4 days Logging: 3 day Total On-Site: 7 days

Future Plan:

Longterm Borehole Observation Plan/Re-entry Plan

<table>
<thead>
<tr>
<th>Hazards/Weather:</th>
<th>Please check following List of Potential Hazards</th>
<th>What is your Weather window? (Preferable period with the reasons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shallow Gas</td>
<td>Complicated Seabed Condition</td>
<td>March to August</td>
</tr>
<tr>
<td>Hydrocarbon</td>
<td>Soo Seabed</td>
<td></td>
</tr>
<tr>
<td>Shallow Water Flow</td>
<td>Currents</td>
<td></td>
</tr>
<tr>
<td>Abnormal Pressure</td>
<td>Fractured Zone</td>
<td></td>
</tr>
<tr>
<td>Man-made Objects</td>
<td>Fault</td>
<td></td>
</tr>
<tr>
<td>H2S</td>
<td>High Dip Angle</td>
<td></td>
</tr>
<tr>
<td>CO2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### IODP Site Summary Forms:

Please fill out information in all gray boxes

**Proposal #: 605-full2** | **Site #:** ECS-1 | **Date Form Submitted:** April 1st 2005

<table>
<thead>
<tr>
<th>Data Type</th>
<th>SSP Requirements</th>
<th>Exists In DB</th>
<th>Details of available data and data that are still to be collected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. High resolution seismic reflection</td>
<td>Yes</td>
<td></td>
<td>Primary Line(s): GH772 line 77238b, 02:00 April 22; line 77237b, 04:30 April 23</td>
</tr>
<tr>
<td>2. Deep Penetration seismic reflection</td>
<td></td>
<td></td>
<td>Primary Line(s): Crossing Lines(s):</td>
</tr>
<tr>
<td>3. Seismic Velocity†</td>
<td></td>
<td></td>
<td>Location of Site on line (SP or Time only)</td>
</tr>
<tr>
<td>4. Seismic Grid</td>
<td></td>
<td></td>
<td>Location of Site on line (SP or Time only)</td>
</tr>
<tr>
<td>5a. Refraction (surface)</td>
<td></td>
<td></td>
<td>Location of Site on line (Time)</td>
</tr>
<tr>
<td>5b. Refraction (near bottom)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. 3.5 kHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Swath bathymetry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8a. Side-looking sonar (surface)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8b. Side-looking sonar (bottom)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Photography or Video</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Heat Flow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11a. Magnetics</td>
<td>Yes</td>
<td></td>
<td>Compiled map published from Geological Survey of Japan</td>
</tr>
<tr>
<td>11b. Gravity</td>
<td>Yes</td>
<td></td>
<td>Compiled map published from Geological Survey of Japan</td>
</tr>
<tr>
<td>12. Sediment cores</td>
<td>Yes</td>
<td></td>
<td>IMAGES MD982195</td>
</tr>
<tr>
<td>13. Rock sampling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14a. Water current data</td>
<td>Yes</td>
<td></td>
<td>JODC web page (<a href="http://www.jodc.go.jp">http://www.jodc.go.jp</a>)</td>
</tr>
<tr>
<td>14b. Ice Conditions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. OBS microseismicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Other</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SSP Classification of Site:** | **SSP Watchdog:** | **Date of Last Review:**

**SSP Comments:**

* required; ** may be required for specific sites; † recommended; † may be recommended for specific sites; R required for re-entry sites; T required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.
### IODP Site Summary Forms:

<table>
<thead>
<tr>
<th>Proposal #: 605-full2</th>
<th>Site #: ECS-1</th>
<th>Date Form Submitted: April 1st 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Depth (m): 746</td>
<td>Sed. Penetration (m): 500</td>
<td>Basement Penetration (m):</td>
</tr>
</tbody>
</table>

Do you need to use the conical side-entry sub (CSES) at this site? Yes □ No ■

Are high temperatures expected at this site? Yes □ No ■

Are there any other special requirements for logging at this site? Yes □ No ■

If “Yes” Please describe requirements: _____________________________

What do you estimate the total logging time for this site to be: ____________

<table>
<thead>
<tr>
<th>Measurement Type</th>
<th>Scientific Objective</th>
<th>Relevance (1-high, 3-Low)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutron-Porosity</td>
<td>Estimation of water content in sedimentary sequences.</td>
<td>3</td>
</tr>
<tr>
<td>Litho-Density</td>
<td>Estimation of water content, bulk density, and mineral composition in sedimentary sequences.</td>
<td>3</td>
</tr>
<tr>
<td>Natural Gamma Ray</td>
<td>Estimation of clay contents and mineral composition in sedimentary sequences.</td>
<td>1</td>
</tr>
<tr>
<td>Resistivity-Induction</td>
<td>Estimation of water content and electro-magnetic properties in sedimentary sequences.</td>
<td>1</td>
</tr>
<tr>
<td>Acoustic</td>
<td>Determination of in situ velocity and estimation of physical properties.</td>
<td>1</td>
</tr>
<tr>
<td>FMS</td>
<td>Imaging of sedimentary structures and fractures.</td>
<td>1</td>
</tr>
<tr>
<td>BHTV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistivity-Laterolog</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnetic/Susceptibility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Density-Neutron (LWD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resitivity-Gamma Ray (LWD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group at:

borehole@ldeo.columbia.edu
http://www.ldeo.columbia.edu/BRG/brg_home.html
Phone/Fax: (914) 365-8674 / (914) 365-3182

Note: Sites with greater than 400 m of penetration or significant basement penetration require deployment of standard toolstrings.
## IODP Site Summary Forms:

Please fill out information in all gray boxes

<table>
<thead>
<tr>
<th>Proposal #: 605-full2</th>
<th>Site #: ECS-1</th>
<th>Date Form Submitted: April 1st 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong> Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)</td>
<td>Triple-APC to 100 mbsf, then double-XBC to 500 mbsf.</td>
<td></td>
</tr>
<tr>
<td><strong>2</strong> Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3</strong> From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>4</strong> Are there any indications of gas hydrates at this location?</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>5</strong> Are there reasons to expect hydrocarbon accumulations at this site? Please give details.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>6</strong> What “special” precautions will be taken during drilling?</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>7</strong> What abandonment procedures do you plan to follow:</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>8</strong> Please list other natural or manmade hazards which may effect ship’s operations: (e.g. ice, currents, cables)</td>
<td>Typhoon (June to October)</td>
<td></td>
</tr>
<tr>
<td><strong>9</strong> Summary: What do you consider the major risks in drilling at this site?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### IODP Site Summary Forms:

#### Form 5 – Lithologic Summary

<table>
<thead>
<tr>
<th>Proposal #: 605-full2</th>
<th>Site #: ECS-1</th>
<th>Date Form Submitted: April 1st 2005</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Sub-bottom depth (m)</th>
<th>Key reflectors, Unconformities, faults, etc</th>
<th>Age</th>
<th>Assumed velocity (km/sec)</th>
<th>Lithology</th>
<th>Paleo-environment</th>
<th>Avg. rate of sed. accum. (m/My)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td></td>
<td>5 Ma</td>
<td>Hemipelagic clay to silt</td>
<td></td>
<td></td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>