

## **IODP Expedition 398: Hellenic Arc Volcanic Field**

### **Week 1 Report (11–17 December 2022)**

International Ocean Discovery Program (IODP) Expedition 398, Hellenic Arc Volcanic Field, began in Tarragona, Spain, on 11 December 2022. Expedition 398 aims to investigate the Christiana-Santorini-Kolumbo (CSK) volcanic field in the Hellenic Arc of the Aegean Sea.

The main objectives of the expedition are to understand: (1) arc volcanism in an active rift environment; (2) the volcano-tectonic connection; (3) arc magmatism in a region of extending crust; (4) an iconic caldera-forming eruption; (5) volcanic hazards from submarine silicic eruptions; (6) the transition from continental to marine environments in the South Aegean; and (7) biological systems reactions to volcanic eruptions and seawater acidification.

In the CSK field, six primary sites are planned, ranging in water depth from 292 to 694 meters below sea level (mbsl). Targeted drill depths range from 234 to 857 meters below sea floor (mbsf). The first site to be occupied during Expedition 398 is Site U1589 (proposed Site CSK-01A) in the Anhydros basin near the Greek island of Amorgos. The ship is scheduled to arrive at Site U1589 in the early morning of 21 December.

### **Operations**

Week 1 of Expedition 398 began on 11 December 2022 with the first line ashore at 0736 h in the port of Tarragona, Spain. The remainder of the day saw the handling of offgoing and incoming freight; of note were two 40 ft containers of core to Bremen and the incoming new Kinley charges for downhole crimping and severing of coring/logging lines. On 12 December the science party and a few of the JRSO technical staff departed. The new Schlumberger high temperature logging cable was loaded, with the old spare cable being offloaded and awaiting shipment back to College Station. Gas bottle racks and freight were loaded. Offgoing core bound for Cambridge, UK, and Portugal was dispensed. The crew change occurred on 13 December, following a four-day quarantine period for the oncoming personnel. COVID testing had been negative for all staff and crew in Spain. Bulk loading was completed, with 71.9 short tons of Sepiolite being brought aboard.

The remainder of the port call was used to handle offgoing and incoming freight, continue COVID testing (PCR and antigen), and for the science party to settle in. Two additional core liner boxes were loaded on 14 December. A lifeboat drill for the science party and new staff/crew was conducted on 15 December, and the final two crew members boarded the ship. Bunkering of 1200 mt of fuel started on 15 December and was completed at 0400 h on 16 December.

The final delivery, consisting of crates with engine oil filters, arrived at ~1100 h on 16 December. The guard shack and gangway were lifted onboard and the vessel was secured for transit.

The pilot boarded the vessel at 1237 h on 16 December. Tug boats were connected and unmooring started at 1242 h. The last line was cleared at 1254 h, marking the start of the transit. The tugs were released at 1302 h and the pilot departed at 1306 h. The week ended at midnight on 17 December with the vessel underway to Site U1589, having completed 406.4 nmi at 11.6 kt, with 835 nmi remaining.

The COPE COVID-19 protocols are being followed with daily antigen testing.

## **Science Results**

For the science party and JRSO staff, Expedition 398 began with a four-day hotel quarantine in Barcelona, Spain, starting on 9 December. The quarantine period was spent conducting virtual scientific meetings as well as preparation and onboarding orientations. These meetings included an introduction to the expedition, IODP coring and logging operations, IODP curation and sampling, publications, and IT services. In addition to these orientation presentations, the science party had three science objectives meetings on 1) core and seismic correlations, 2) petrology and geochemistry, and 3) the Minoan eruption and volcanic hazards. Throughout the quarantine period, all laboratory groups met in individual virtual meeting rooms to start discussing and drafting their methods chapters and deliverables.

After boarding the vessel in small groups at 1300 h on 13 December, JRSO staff helped the scientists to familiarize themselves with the ship. To account for the COPE COVID mitigation protocol, the science party was subdivided into four groups that were selected by shift schedule and proximity in the laboratories. Throughout the week, these groups attended shipboard orientation, life at sea and safety presentations, and rig floor and coring tool orientations, as well as an introduction to core flow and IODP curation. JRSO technicians provided each laboratory group shift with in-depth training for their work areas and devices. Sediment cores from previous expeditions that were designated for training and educational purposes were used to familiarize the physical properties and core description groups with the operation of their laboratory-specific logging tracks. All groups completed the first draft of their methods chapters and worked on the revisions provided by the science office.

## **Education and Outreach**

This week, the expedition's shipboard Outreach Officer conducted one live tour with Reach the World. Three classrooms participated live, with five more watching the recording later. In total, the Reach the World stream reached 225 students.

Across all social media platforms we had 29,325 impressions, and an average engagement rate of 9.01%. Given the early stage of the expedition, this rate of engagement is promising as the industry standard for a “good” engagement rate is between 1% and 5%. On [Twitter](#), our largest social media following—which makes achieving a good engagement rate harder—we had a 3.62% engagement rate. [Instagram](#) and [Facebook](#) brought our engagement average up with rates of 13.29% and 10.4%, respectively.

## **Technical Support and HSE Activities**

### *Laboratory Activities*

- Scientists and new JRSO staff watched the Siem Offshore shipboard safety video and were given laboratory safety tours.
- Core flow tours and specific laboratory safety training were conducted.
- Finished loading and offloading freight.
- Conducted GEODESC training for the scientists.
- Conducted instrument training in all laboratories for the scientists.
- Installed TVs in five staterooms.
- New Labconco freeze-drier is set up in the Thin Section Laboratory.
- Christmas decorations are up!
- Installed the old Hitachi scanning electron microscope (SEM) in the Core Laboratory.
- The superconducting rock magnetometer (SRM) Haskris water chiller was clogged. A thorough cleaning of the Haskris unit and the filter was conducted. The main flow valve was found mechanically open and is now disconnected. Water temperature is now maintained at 68°F. A bucket of ship chill water containing rust particles was collected and shown to a Siem Offshore engineer. A plan to drain and clean the chill water line for the Core Deck is needed for the upcoming tie-up period.
- Water maker in the Chemistry Laboratory: GenPure displayed error of “Limit Value Feed” indicating feed water with low resistivity. We suspected bad port water quality. Both RO and Genpure units were disconnected during port call. Upon departure, both membranes were replaced in the RO unit. We then reconnected both units. The resistivity in RO is currently running at 0.1 MΩ, which is borderline of an acceptable level.
- Play core inventory was completed.

### *IT Support Activities*

- Data backups from Expedition 397 did not contain all the necessary content and the data from the ship’s Cleveland server was not backed up. Missing Expedition 397 data were loaded to an external hard drive and hand carried back to College Station.
- The Eaton uninterruptible power supply (UPS) was repaired and the Data Center will be switched over to UPS power in the near future. This was to occur at the beginning of the

expedition; however, it was delayed due to potential certificate expiration issues with the ship's OES servers.

- OES server certificates updated.

#### *Application Support Activities*

- Database ready for use for Expedition 398 data management.
- User accounts and privileges established for science party.
- GEODESC: migrated catalog changes that support new template definitions.

#### *Health, Safety, and Environment Activities*

- Emergency shower and eye wash stations were tested.
- Scheduled and conducted daily COVID tests.
- COPE Protocol is being followed.