

Contents

Preface	3
Acknowledgments	4
Introduction.....	8
A note on naming of roles and program areas	9
1. Overview of shipboard sedimentology activities	10
1.1. Sedimentologist duties and goals of shipboard core description	10
1.1.1. Sedimentology team tasks: overview and checklist.....	10
1.2. General core laboratory procedures (outside of sedimentology team).....	10
1.3. Team and workflow organization on the <i>JOIDES Resolution</i>	12
1.4. Team strategies for core description.....	14
1.4.1. Meeting strategies	14
1.4.2. VCD strategy recommendations	14
2. Writing lithostratigraphic methods	15
2.1. Key points with respect to methods	15
2.2. Lithostratigraphy methods: essential elements.....	16
3. Sediment classification schemes	17
3.1. Classification of sediment and sedimentary rock types: general.....	19
3.2. Classification based on grain size (texture).....	19
3.3. Classification based on lithification state	23
3.4. Classification based on lithology and relevant background	24
3.4.1. Siliciclastic sediment/rock.....	24
3.4.1.1. Terrigenous sediment/rock	24
3.4.1.2. Serpentine-rich (serpentilastic) sediment.....	27
3.4.1.3. Volcaniclastic sediment/rock	27
3.4.2. Biogenic sediment/rock.....	28
3.4.2.1. Pelagic sediment/rock.....	28
3.4.2.2. Neritic carbonate sediment/rock	30
3.4.3. Mixed sediment/rock.....	31
3.4.3.1. General comments on mixed sediment/rock.....	31
3.4.3.2. Organic-bearing and organic-rich sediment/rock	31
3.4.4. Chemical sediment/rock	32
3.4.4.1. Evaporitic sediment/rock.....	32
3.4.4.2. Metalliferous sediment/rock.....	32
3.5. Diagenetic impacts on lithology in marine cores.....	33
4. Visual description of sedimentary cores	35
4.1. Elements of core description	35
4.1.1. Drilling and core-handling disturbance.....	35
4.1.1.1. Disturbance terms for soft to semi-indurated formations.....	38
4.1.1.2. Disturbance terms for indurated formations.....	38
4.1.1.3. Other types of core disturbance.....	38
4.1.1.4. Core surface disturbance during cutting	40
4.1.2. Lithology	40
4.1.3. Color.....	41
4.1.4. Bedding and sedimentary structures	42
4.1.4.1. Bed thickness and attitude.....	42
4.1.4.2. Nonbiogenic sedimentary structures and bedding planes.....	43
4.1.4.3. Biogenic sedimentary structures (bioturbation)	43
4.1.4.4. Complex beds and depositional units.....	45
4.2. Shipboard database and construction of visual core description (VCD) sheets	46
4.3. Construction and use of sedimentary core description forms (CDF)	48

5. Petrologic sample description procedures	55
5.1. Smear slides and thin sections	55
5.1.1. Sample selection	55
5.1.2. Thin section requests.....	55
5.1.3. Fabrication of smear slides and thin sections.....	56
5.1.3.1. Staining thin sections	56
5.1.4. Description of smear slides and thin sections	56
5.1.4.1. Description aids	57
5.1.5. Photomicrographs to document smear slides and thin sections.....	59
5.1.6. Archiving	59
5.2. Scanning electron microscopy (SEM).....	59
5.3. X-ray diffraction (XRD)	60
5.4. Carbonate and organic matter (geochemistry).....	60
6. Core-logging (track) systems	61
6.1. General considerations	61
6.2. Section-Half Imaging Logger (SHIL): image scanning	61
6.3. Section-Half Multisensor Logger (SHMSL)	62
6.3.1. Color reflectance spectroscopy	62
6.3.2. Point-source magnetic susceptibility	62
6.4. X-ray Image Logger	62
6.5. Other online resources	63
7. Site lithostratigraphy and other expedition reports	64
7.1. Establishing lithostratigraphic units and writing site chapters.....	64
7.2. Outline of a chapter lithostratigraphy section.....	65
7.2.1. Introduction	65
7.2.2. Unit descriptions	65
7.2.2.1. Unit header.....	65
7.2.2.2. Subunit descriptions.....	65
7.2.2.3. Photographic documentation.....	66
7.2.2.4. Hole correlation	66
7.2.2.5. Interpretation	66
7.2.2.6. References	67
7.2.2.7. Tables and figures.....	67
7.3. Good practices for core/site summaries	67
7.3.1. Anticipating unit boundaries.....	67
7.3.2. Designating unit boundaries: consensus and specifics	67
7.3.3. Use of previous local leg/expedition format.....	67
7.3.4. Accommodating midstream changes in format/lithology definitions	68
7.3.5. Summarizing and integrating core-level descriptions (holes vs. site)	68
8. Chikyu, MSP, and repository-based core description	69
References	72
General appendices	78
Chapter appendices	79