

# Data Report: UT-GOM2-1 Lithostratigraphic Core Description Logs at Site GC 955, Holes H002 and H005<sup>1</sup>

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## 1. Abstract

Lithostratigraphic core description provides a record of the stratigraphic variation in composition, texture, and sedimentary structure preserved in marine sediment cores. Here we present graphical lithostratigraphic core description logs for pressure cores collected during the 2017 UT GOM2-1 Expedition. The cores summarized here were those that were not retrieved under pressure, but nevertheless recovered some sufficient, intact strata that represent the host lithology across the Green Canyon (GC) 955 gas hydrate reservoir. Our results here represent visual core descriptions and include split core photos and location data for samples collected during core description.

## 2. Introduction

The objective of this report is to present lithostratigraphy summary logs based on visual core descriptions and sampling of UT-GOM2-1 pressure cores (Flemings et al., 2018) that were stored, post-expedition, at The Ohio State University. These cores were not recovered under pressure during the UT GOM2-1 expedition but did retain their sediments. Lithostratigraphic core descriptions of recovered sediments represent an important data set that is used directly to characterize the host lithology in gas hydrate bearing marine sediments and to provide context for additional sampling (e.g. grain size, TOC).

<sup>1</sup> Johnson, J.E., Divins, D.L., 2020. Data Report: UT-GOM2-1 Lithostratigraphic Core Description Logs at Site GC 955, Holes H002 and H005. In Flemings, P.B., Phillips, S.C, Collett, T., Cook, A., Boswell, R., and the UT-GOM2-1 Expedition Scientists, Proceedings of the UT-GOM2-1 Hydrate Pressure Coring Expedition: Austin, TX (University of Texas Institute for Geophysics, TX). 30 p.

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Additional pressure cores recovered under pressure and then subsequently quantitatively degassed, either on-board or on-shore (UT-Austin) to determine the hydrate concentration and the gas composition were not available for core description and thus not included here.

During the UT-GOM2-1 Expedition two holes were drilled in Green Canyon Block 955 (GC 955) in the deepwater Gulf of Mexico: Hole GC 955 H002 (H002) and Hole GC 955 H005 (H005). 21 10 ft (3.05 m) pressure cores were attempted in and near the methane hydrate reservoir. In the first hole, H002, 1 of the 8 cores were recovered under pressure and there was 34% recovery of sediment (both pressurized and depressurized). In the second hole, H005, 12 of the 13 cores were recovered under pressure and there was 72% recovery of sediment (Flemings et al., 2020; Thomas et al., 2020).

### 3. Methods and Materials

Visual core descriptions (VCDs) are based on macroscopic and microscopic sediment type, sedimentary structures, and drilling disturbance. Visual core descriptions were completed on the subset of cores stored at Ohio State University. Text versions of these core descriptions along with smear slide microscopic descriptions were provided previously in the UT-GOM2-1 Expedition Report (Flemings et al., 2018c).

Here we present graphical summaries of these core descriptions, including the core photos and location information for samples that were collected for additional measurements. We use the following sample type abbreviations in the core logs presented below: GS (grain size), Bio (Biostratigraphy), SS (smear slide), CHNS (for CHNS elemental analysis) and Car (possible authigenic carbonate). Grain size (GS) samples labeled in the core logs shown here were analyzed by a Malvern Mastersizer 2000 Laser Diffractometer and are presented in the 2019 UT-GOM2-1 Sediment Grain Size Measurement Data Report. Smear slide (SS) results are presented in the UT GOM2-1 Expedition Report (Flemings et al., 2018), CHNS (for CHNS elemental analysis) sample results are in preparation for publication in the AAPG GOM2-1 Special Volume, and possible authigenic carbonates (Car) were not investigated beyond visual core description. Sediment color was determined using the Munsell soil color chart (Munsell Color Company, Inc., 1975).

### 4. Results

Graphical lithostratigraphic core logs for each core section described in Holes H002 and H005 are shown below as full-page figures in stratigraphic order, Hole H002 following by Hole H005. Core logs without photos had limited sediment recovery and residual sediments from the liners were stored in a single bag prior to lithostratigraphic core description. Core sections labeled H005 12FB Bonus-1 and Bonus-2 are sections of sediment that resulted from additional material that flowed in through the bottom of the coring tool and was lodged between the liner and the rabbit (see Flemings et al., 2018).

### 5. Acknowledgements

We gratefully acknowledge the 2017 UT-GOM2-1 Scientific Party for their tremendous efforts at sea

to collect the GOM2-1 pressure cores and Dr. Ann Cook and Dr. Derek Sawyer of The Ohio State University for hosting Dr. Johnson and providing lab space and access to the GOM2-1 cores for core description and grain size sampling in 2017.

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## 6. References

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Munsell Color Company, Inc., 1975, Munsell soil color charts: Baltimore, MD.

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Pettigrew, T., Mimitz, M., Holland, M., and Schultheiss, P., 2020, Pressure coring operations during The University of Texas-Gulf of Mexico 2-1 (UT-GOM2-1) Hydrate Pressure Coring Expedition in Green Canyon Block 955, northern Gulf of Mexico: AAPG Bulletin, v. 104, no. 9, p. 1877-1901.

## 7. Figures

Lithostratigraphic Summary Logs are shown below in stratigraphic order Hole H002 followed by Hole H005. Section depths, refer to the depth within each section noted during lithostratigraphic core description. Absolute core section depths (feet below the seafloor) are available in the Expedition Proceeding H002 and H005 reports (Flemings et al., 2018a, b).

UT-GOM2-1- CORE SEDIMENTOLOGY/STRATIGRAPHY

Core ID: H002-1CS-1, 35-79 cm, logged as 0-44 cm

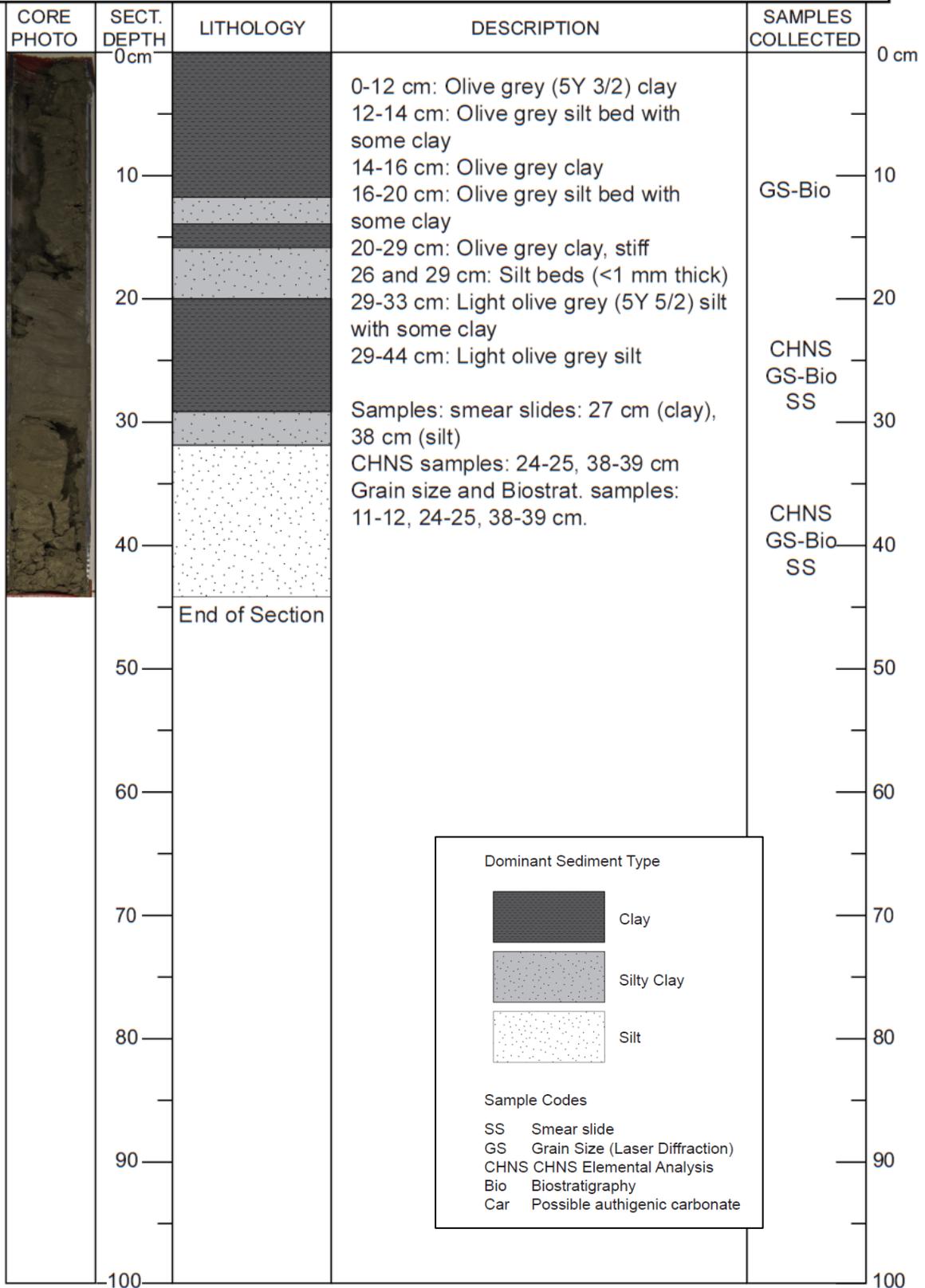


Figure 1: Lithostratigraphic Summary Log of GC 955-H002-1CS-1 (35-79cm) logged as 0-44cm.

UT-GOM2-1- CORE SEDIMENTOLOGY/STRATIGRAPHY  
 Core ID: H002-2CS-1, 0-45 cm, Limited Recovery

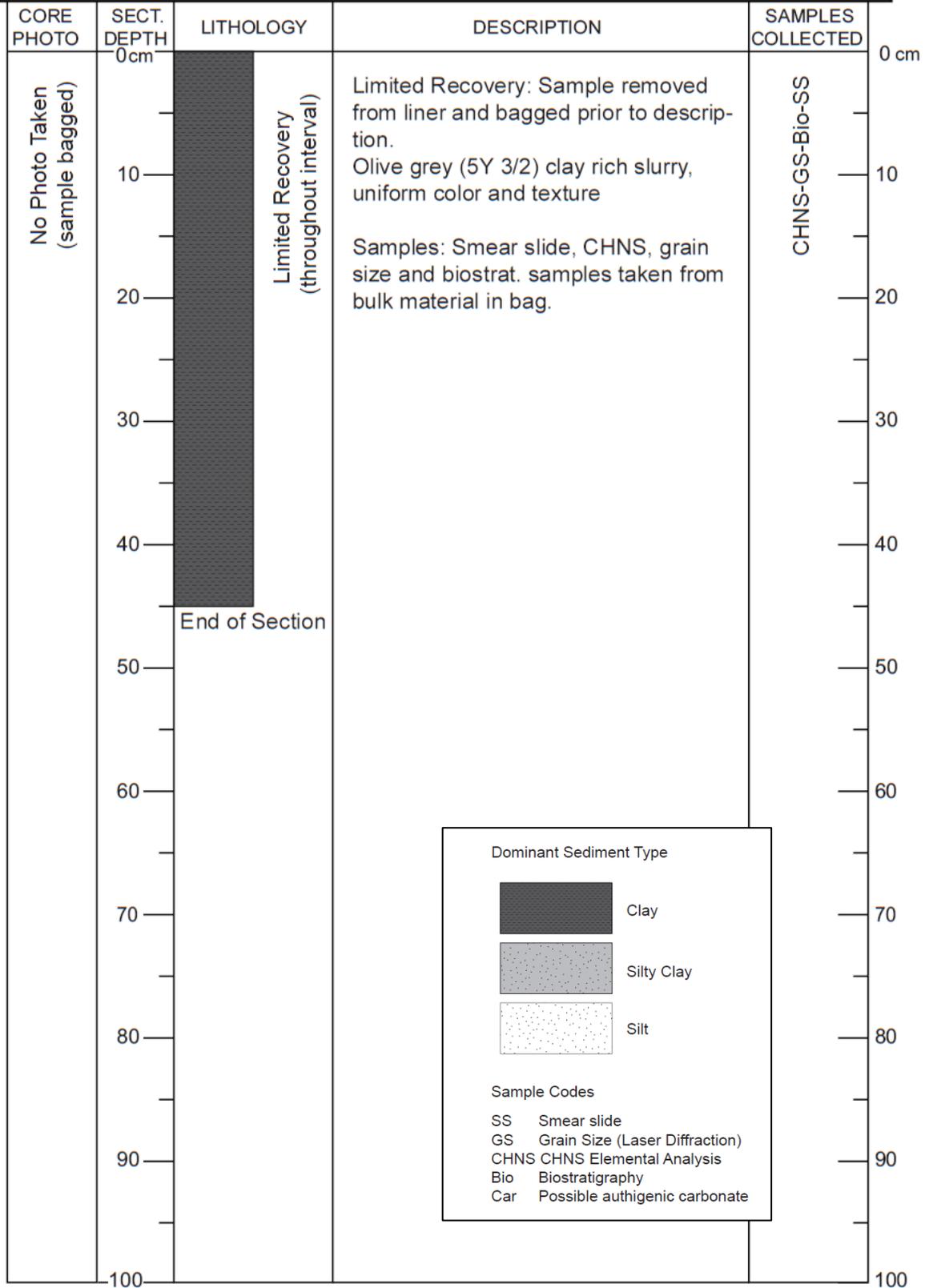


Figure 2: Lithostratigraphic Summary Log of GC 955-H002-2CS-1 (0-45cm) Limited Recovery.

UT-GOM2-1- CORE SEDIMENTOLOGY/STRATIGRAPHY

Core ID: H002-2CS-2, 45-91 cm, logged as 0-46 cm

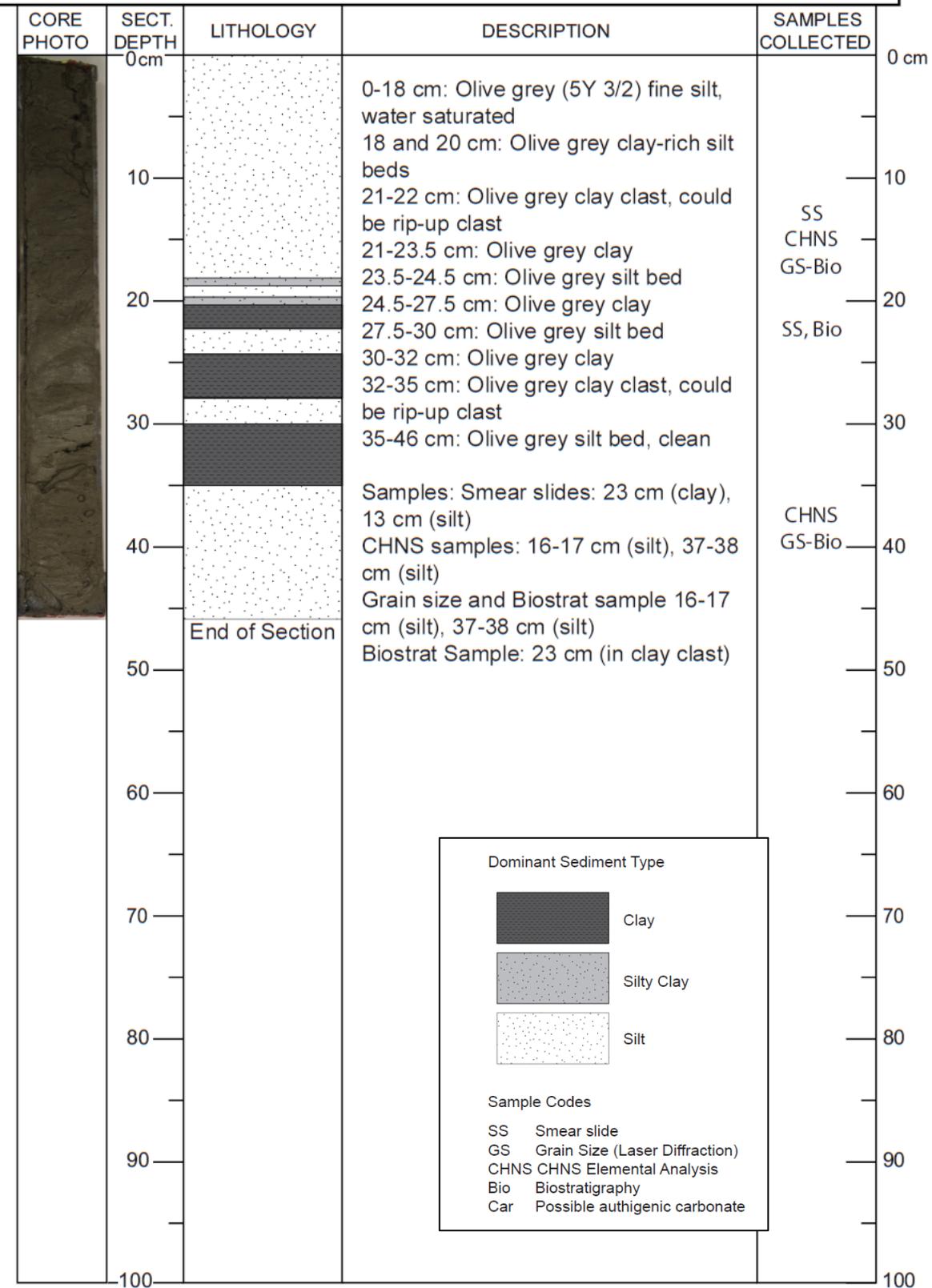


Figure 3: Lithostratigraphic Summary Log of GC 955-H002-2CS-2 (45-91cm) logged as 0-46 cm.

UT-GOM2-1- CORE SEDIMENTOLOGY/STRATIGRAPHY  
 Core ID: H002-2CS-3, 125-225 cm, logged as 0-100 cm

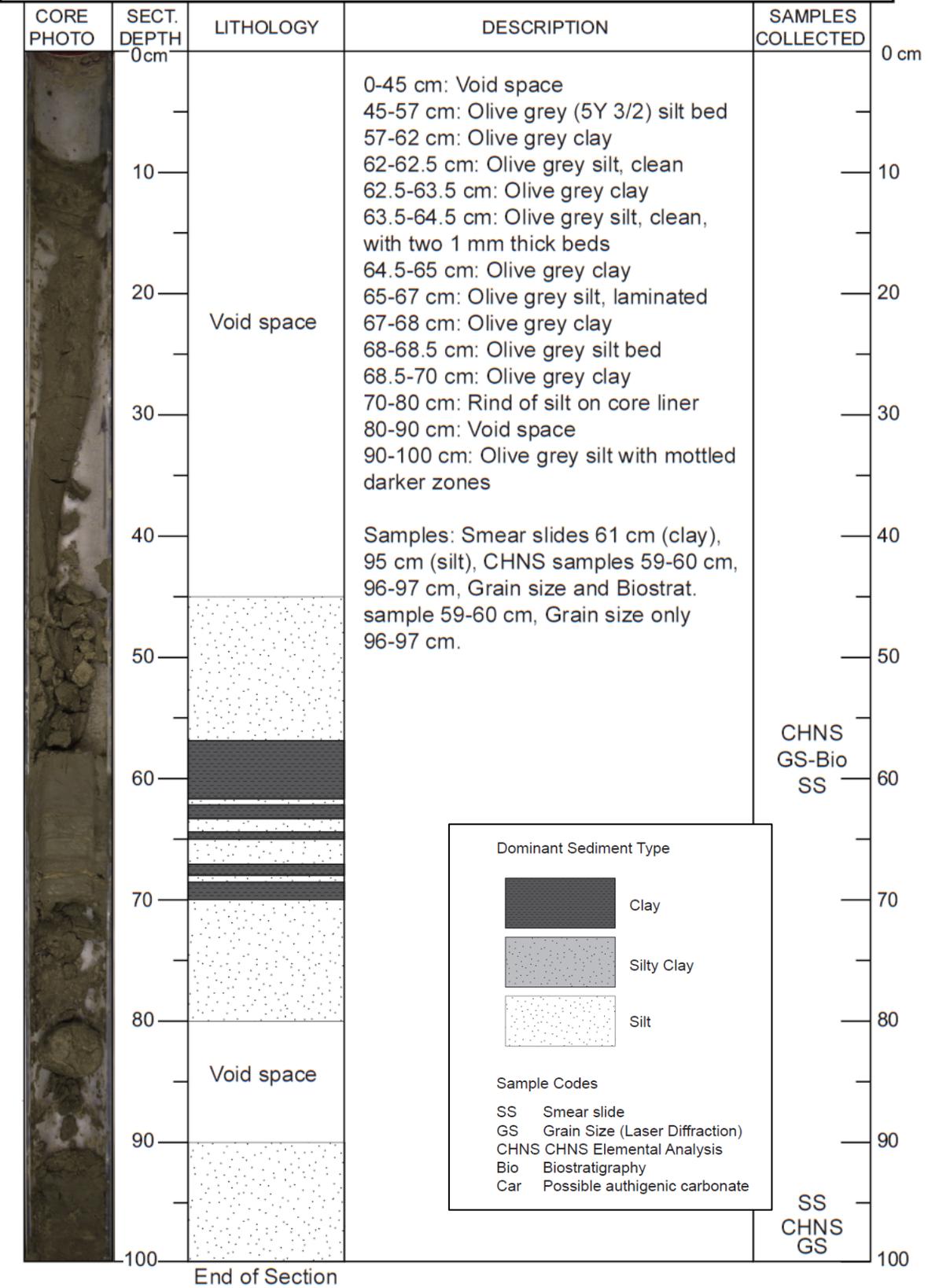


Figure 4: Lithostratigraphic Summary Log of GC 955-H002-2CS-3 (125-225cm) logged as 0-100 cm.



UT-GOM2-1- CORE SEDIMENTOLOGY/STRATIGRAPHY  
 Core ID: H002-3CS-1, 0-27 cm, logged as 0-28 cm

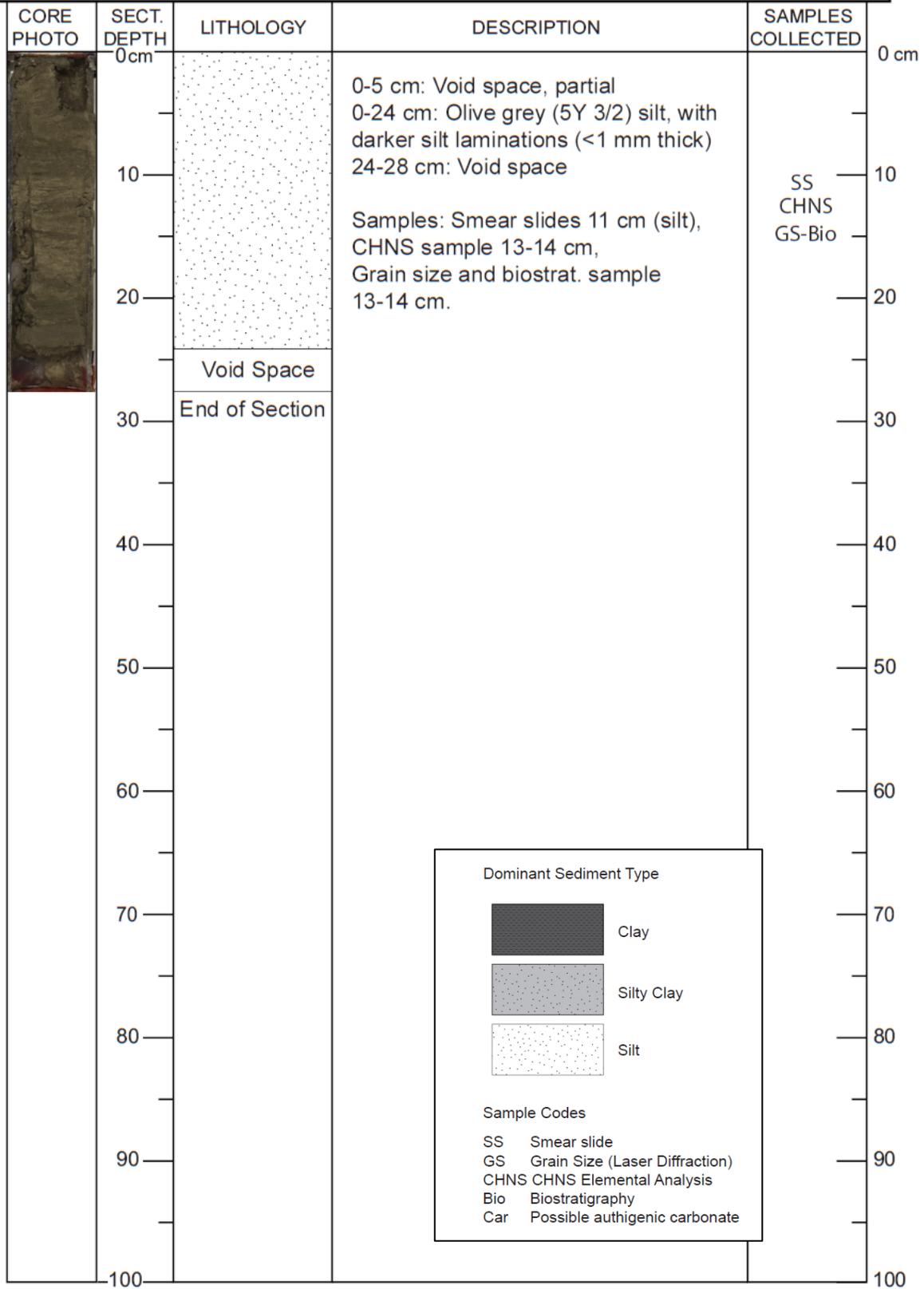


Figure 6: Lithostratigraphic Summary Log of GC 955-H002-3CS-1 (0-27cm) logged as 0-28 cm.

UT-GOM2-1- CORE SEDIMENTOLOGY/STRATIGRAPHY

Core ID: H002-5CS-1, 0-95 cm, logged as 0-95 cm

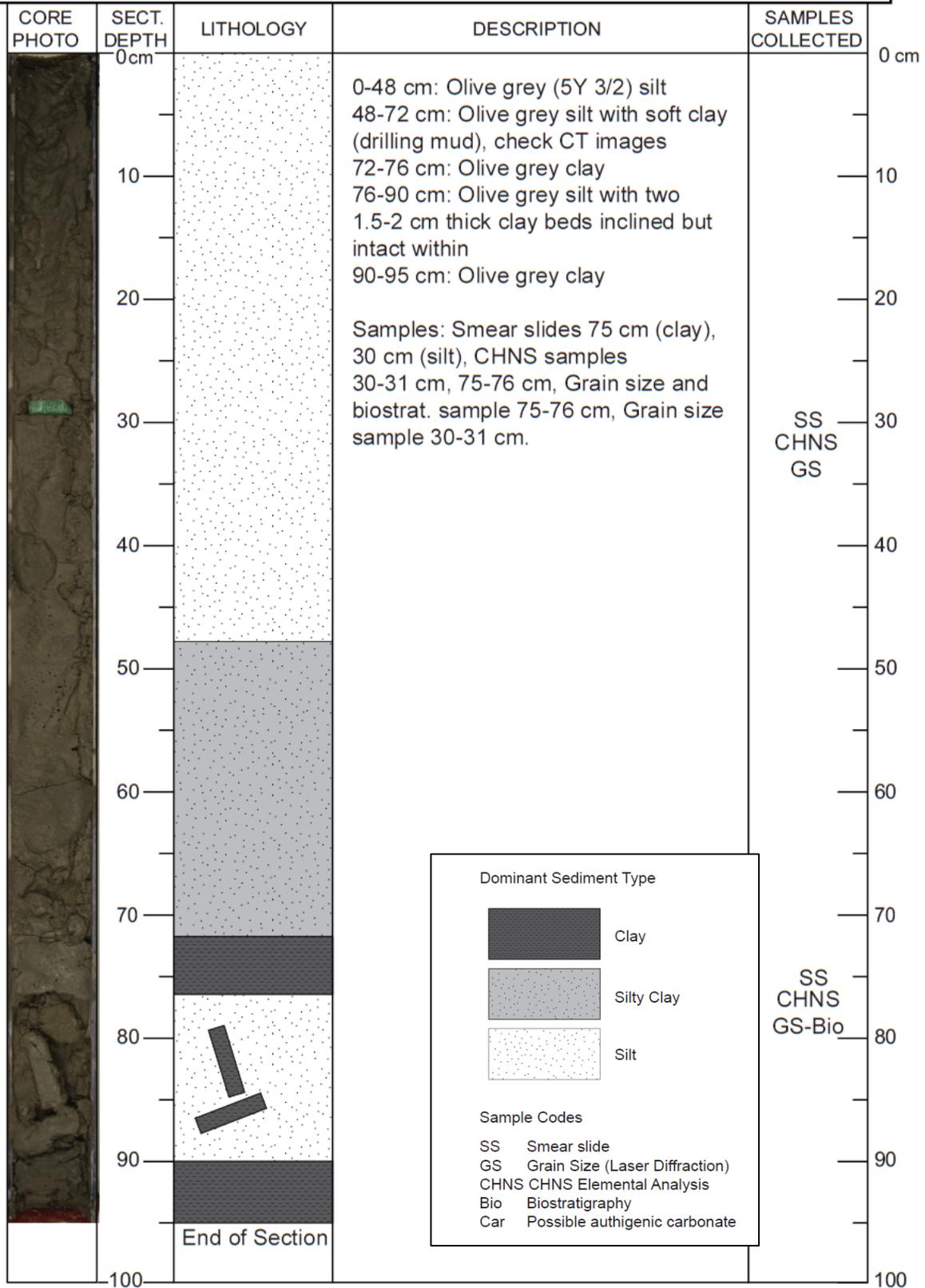


Figure 7: Lithostratigraphic Summary Log of GC 955-H002-5CS-1 (0-95cm) logged as 0-95 cm.

UT-GOM2-1- CORE SEDIMENTOLOGY/STRATIGRAPHY  
 Core ID: H002-6CS-1, 0-19 cm, logged as 0-19 cm

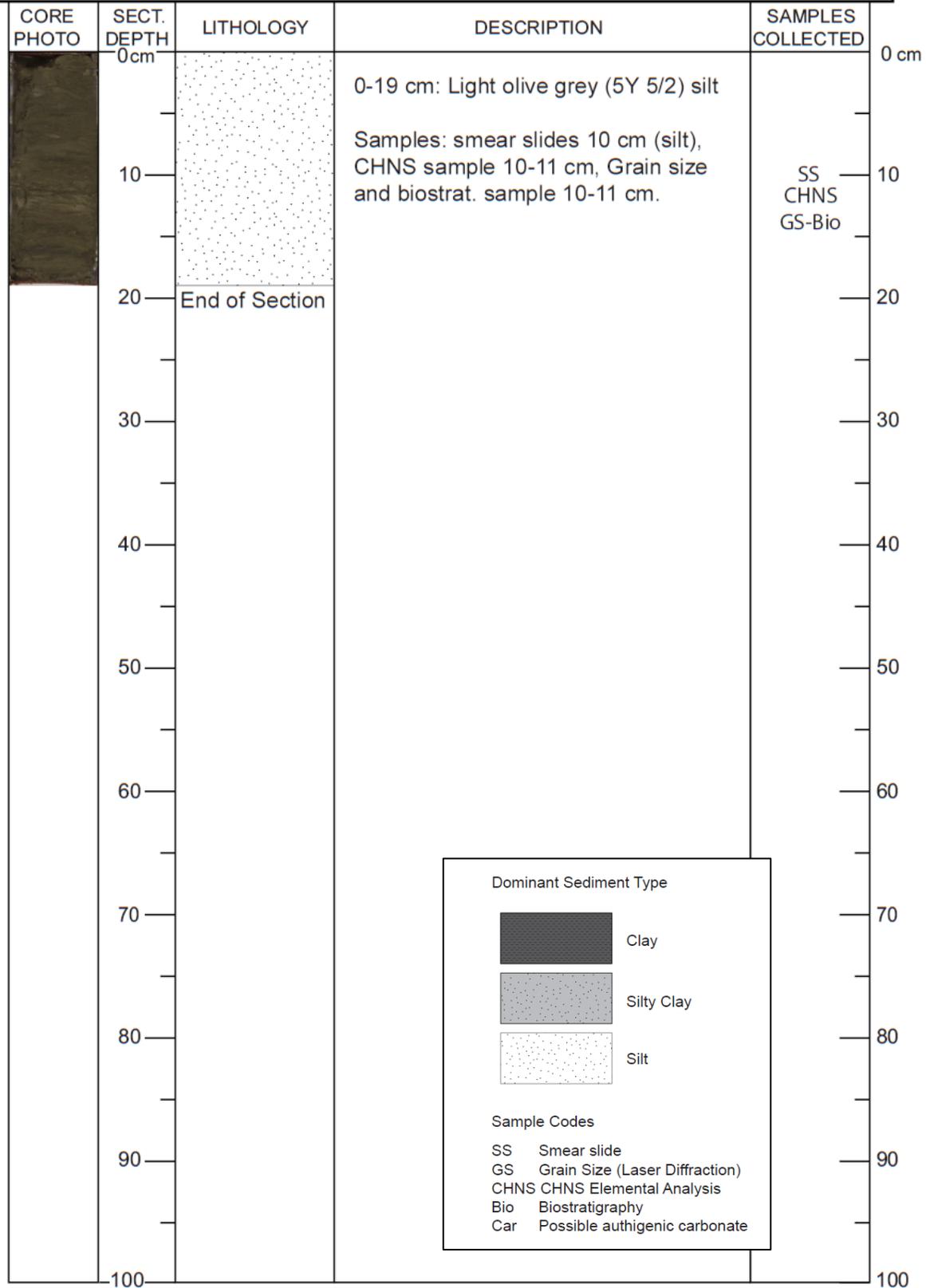


Figure 8: Lithostratigraphic Summary Log of GC 955-H002-6CS-1 (0-19cm) logged as 0-19 cm.

UT-GOM2-1- CORE SEDIMENTOLOGY/STRATIGRAPHY  
 Core ID: H002-6CS-2, 19-119 cm, Limited Recovery

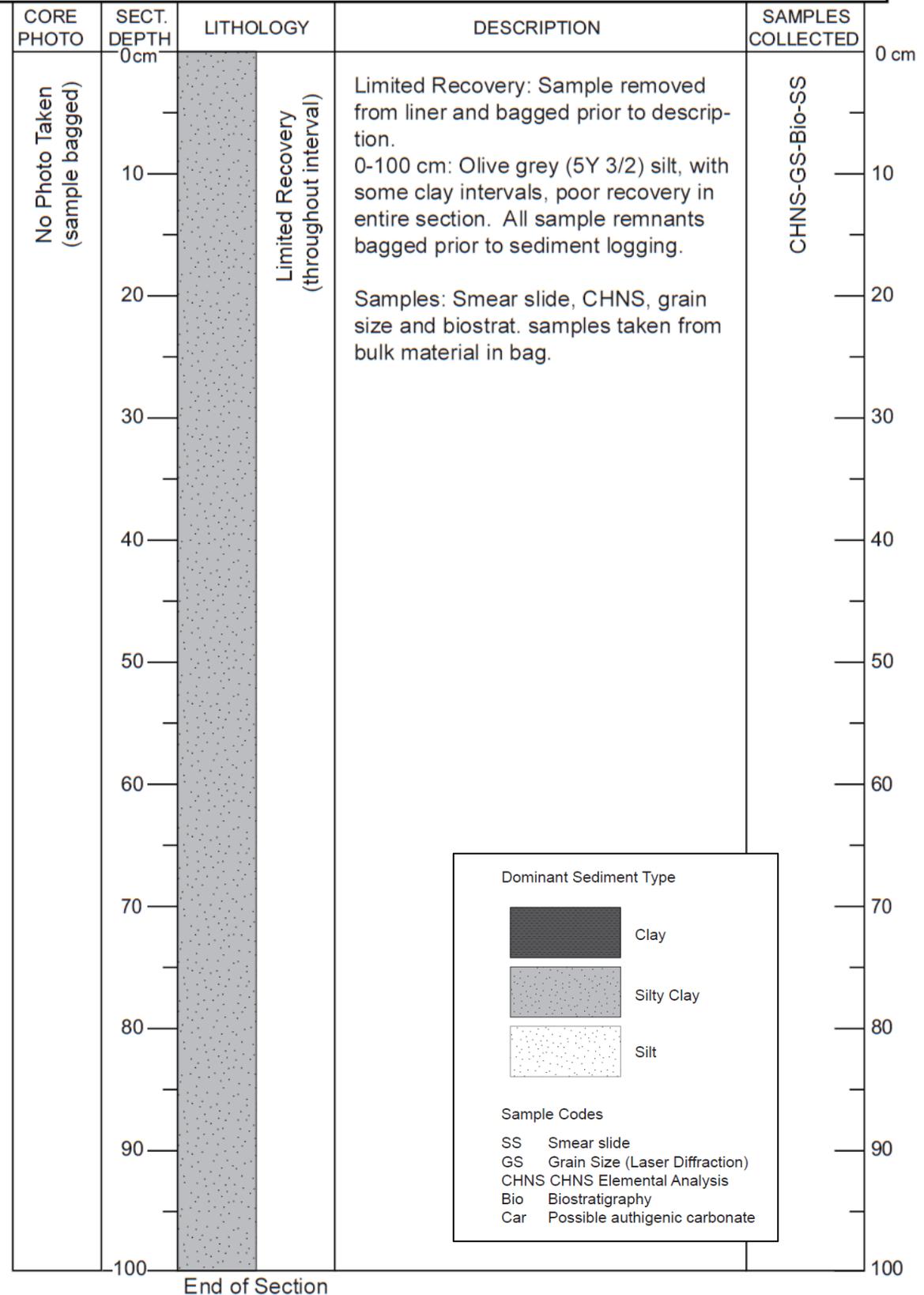


Figure 9: Lithostratigraphic Summary Log of GC 955-H002-6CS-2 (19-119cm) Limited Recovery.

UT-GOM2-1- CORE SEDIMENTOLOGY/STRATIGRAPHY  
 Core ID: H002-6CS-3, 119-219 cm, Limited Recovery

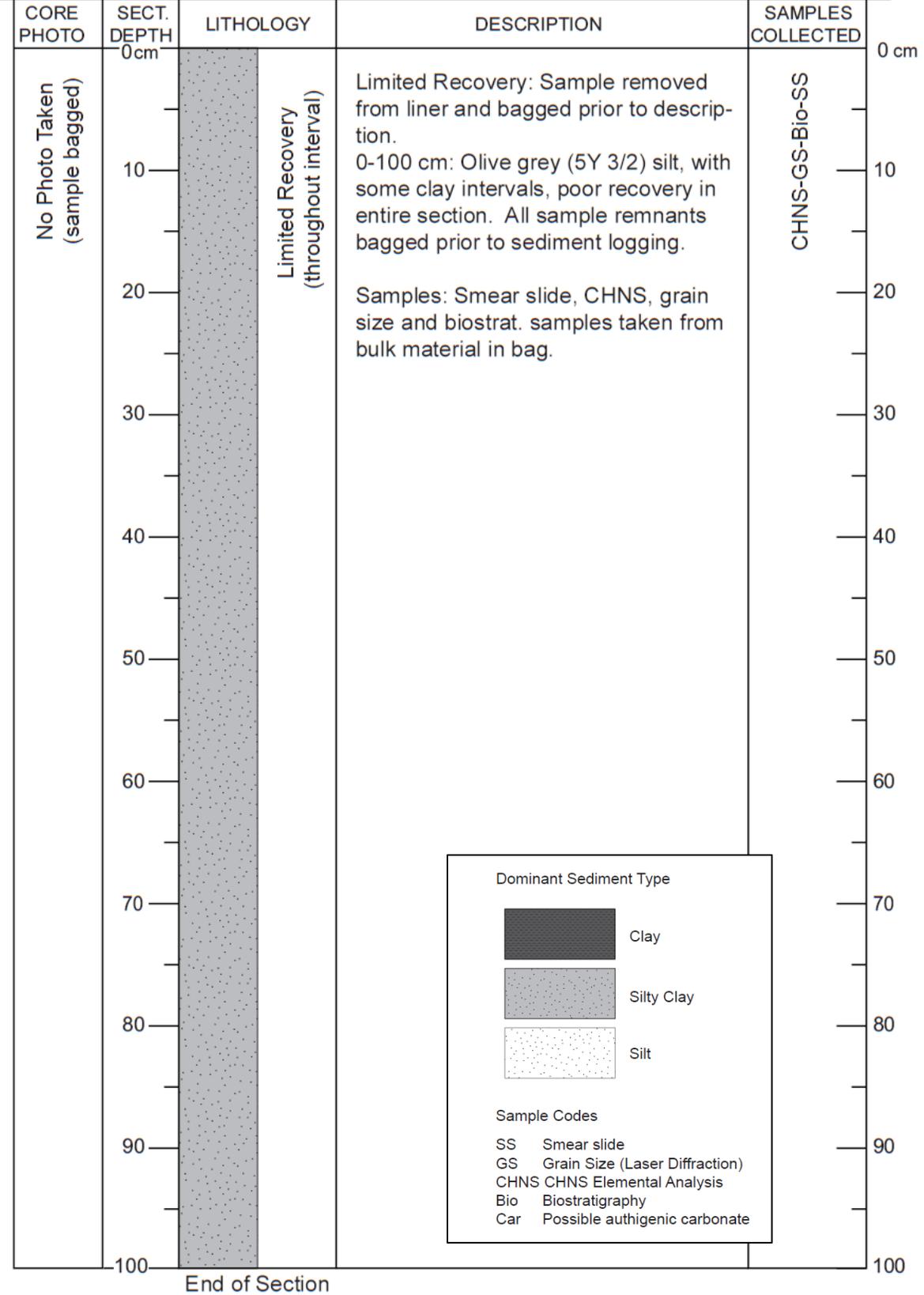


Figure 10: Lithostratigraphic Summary Log of GC 955-H002-6CS-3 (119-219cm) Limited Recovery.

UT-GOM2-1- CORE SEDIMENTOLOGY/STRATIGRAPHY  
 Core ID: H002-6CS-4, 219-282 cm, logged as 0-63 cm

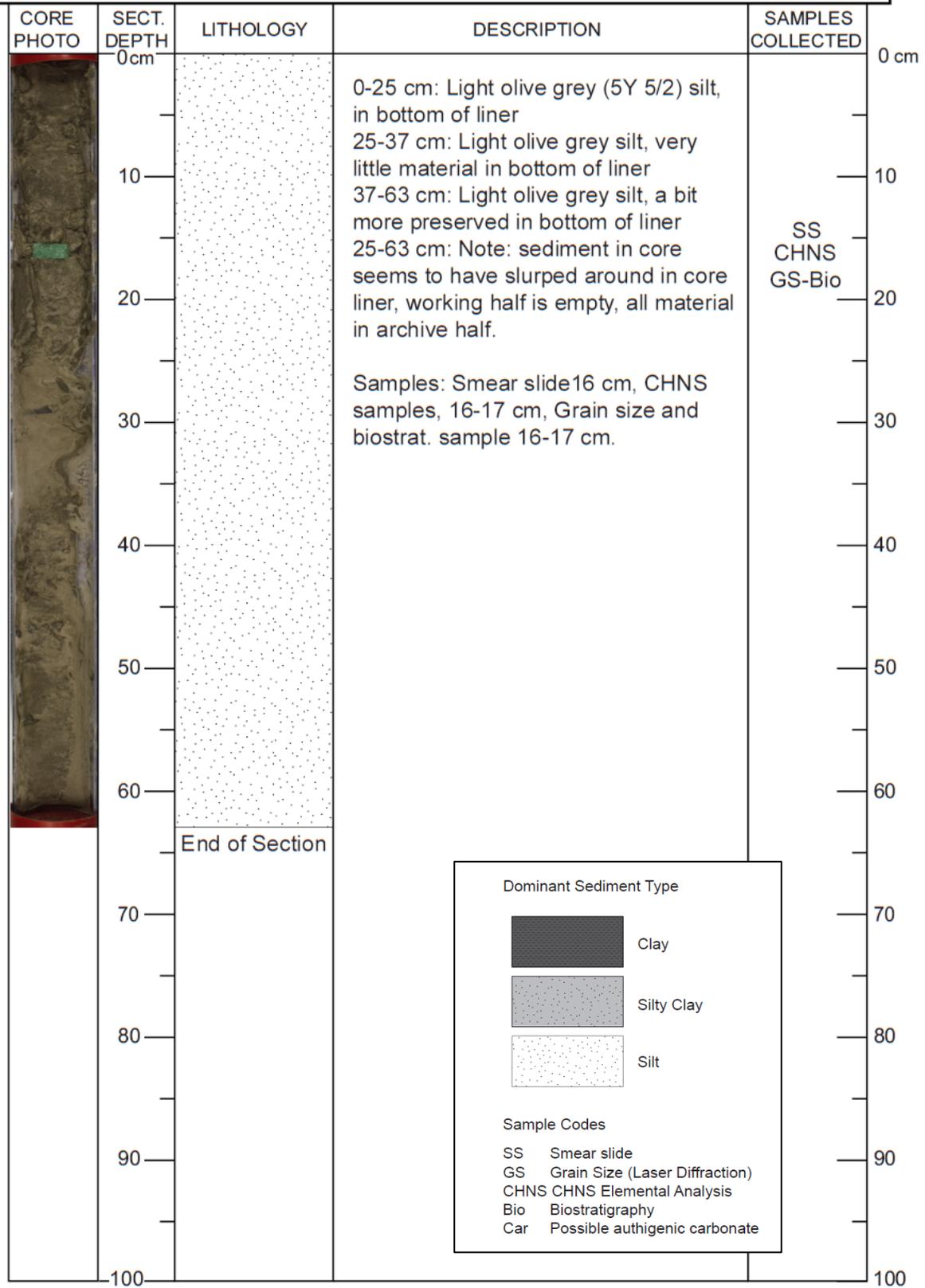


Figure 11: Lithostratigraphic Summary Log of GC 955-H002-6CS-4 (219-282cm) logged as 0-63 cm.

UT-GOM2-1- CORE SEDIMENTOLOGY/STRATIGRAPHY

Core ID: H002-6CS-5, 319-338 cm, logged as 0-20 cm

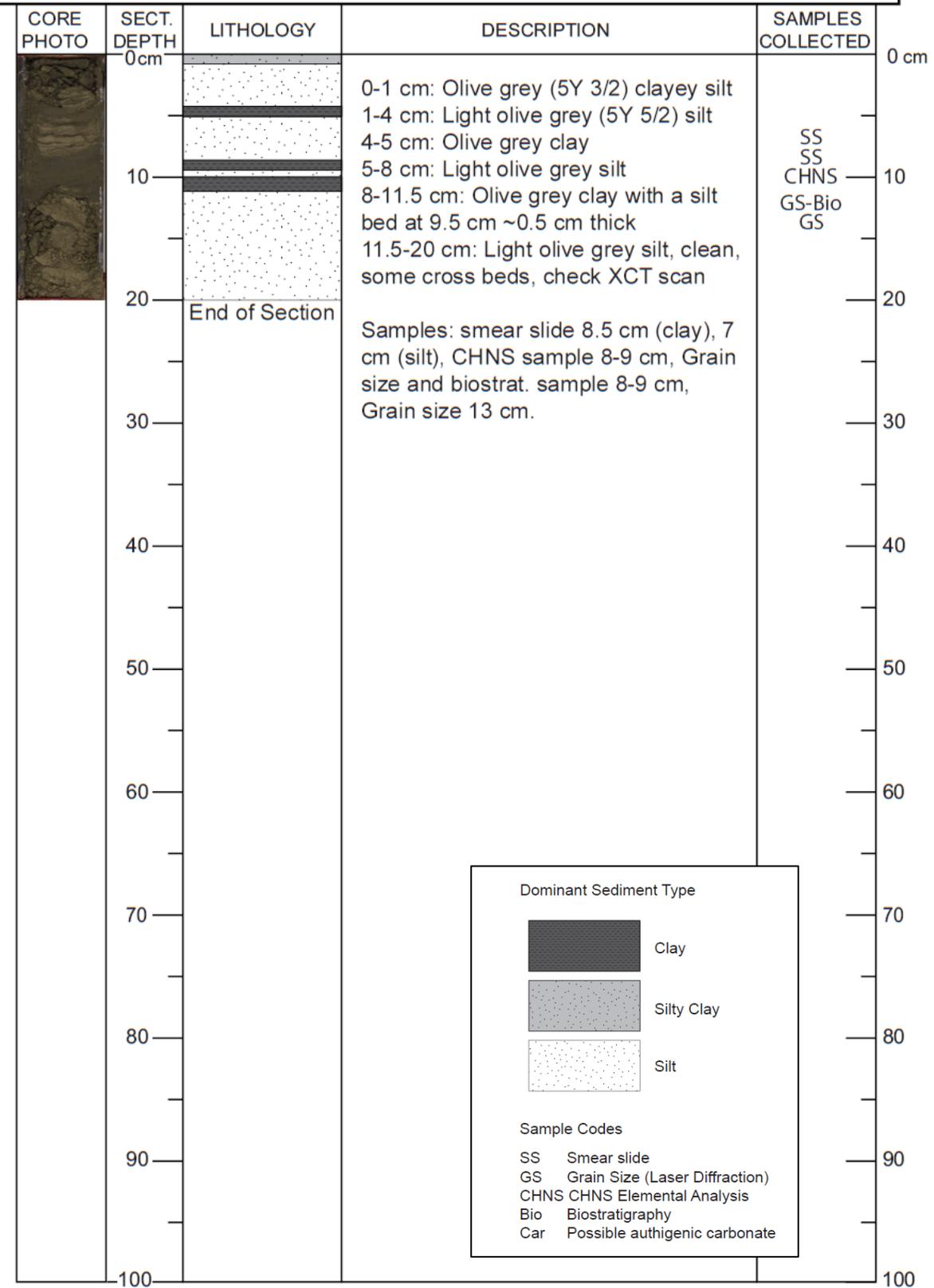


Figure 12: Lithostratigraphic Summary Log of GC 955-H002-6CS-5 (319-338cm) logged as 0-20 cm.

UT-GOM2-1- CORE SEDIMENTOLOGY/STRATIGRAPHY  
 Core ID: H002-7CS-1, 6-72 cm, Limited Recovery

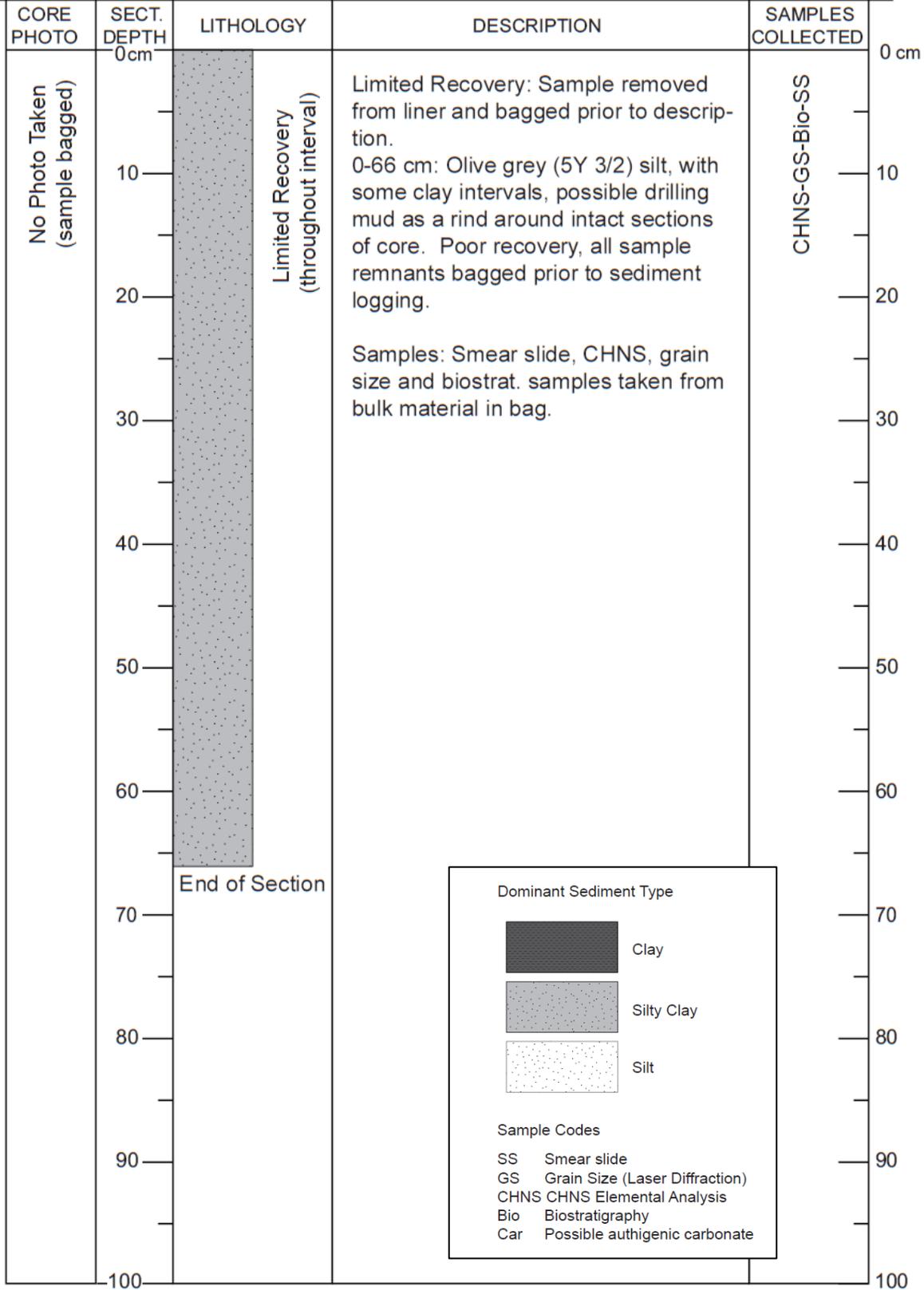


Figure 13: Lithostratigraphic Summary Log of GC 955-H002-7CS-1 (6-72cm) Limited Recovery.

UT-GOM2-1- CORE SEDIMENTOLOGY/STRATIGRAPHY  
 Core ID: H002-8CS-2, 57-157 cm, logged as 0-100 cm

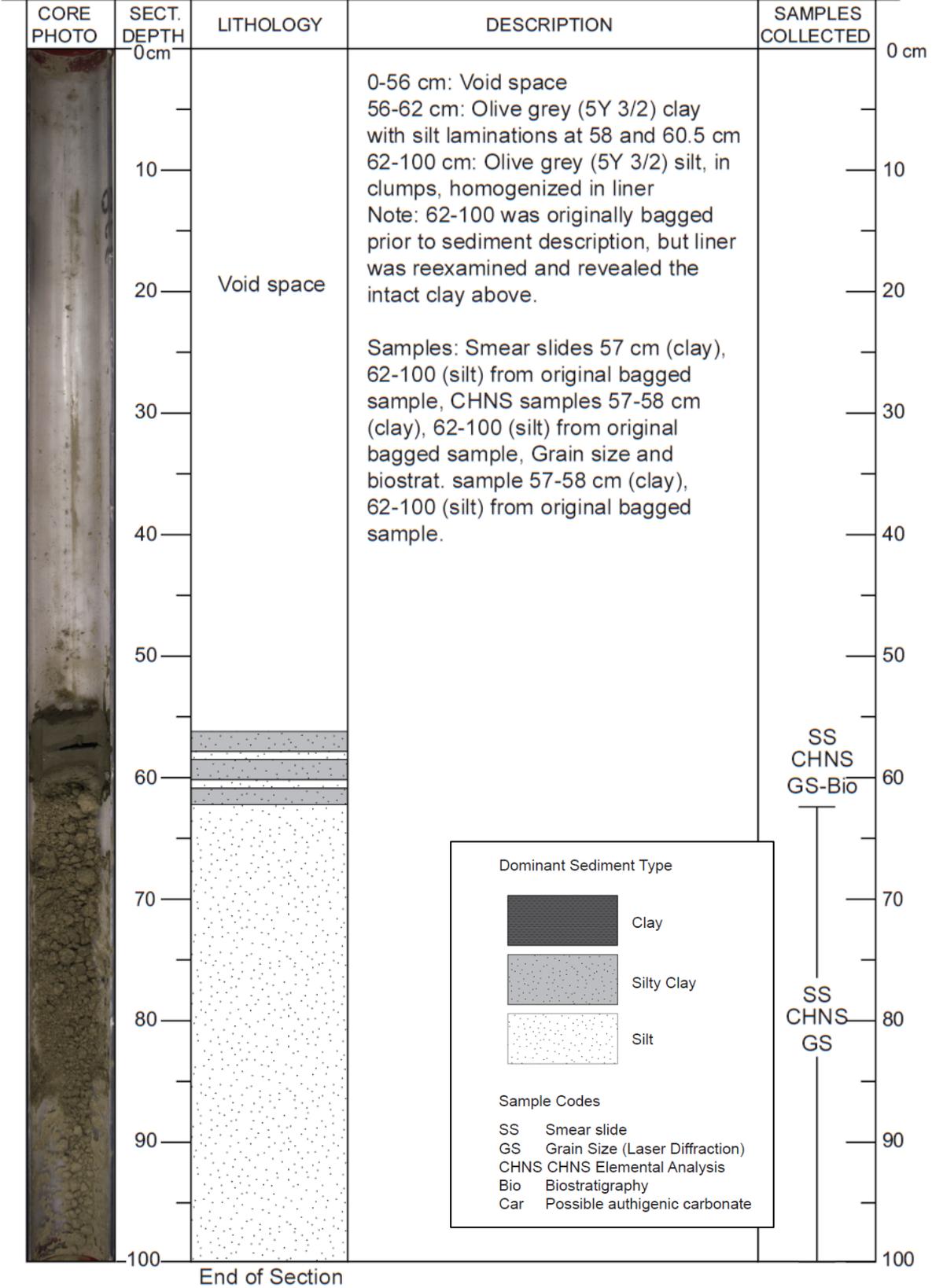


Figure 14: Lithostratigraphic Summary Log of GC 955-H002-8CS-2 (57-157cm) logged as 0-100 cm.

UT-GOM2-1- CORE SEDIMENTOLOGY/STRATIGRAPHY

Core ID: H002-8CS-3, 157-235 cm, Limited Recovery

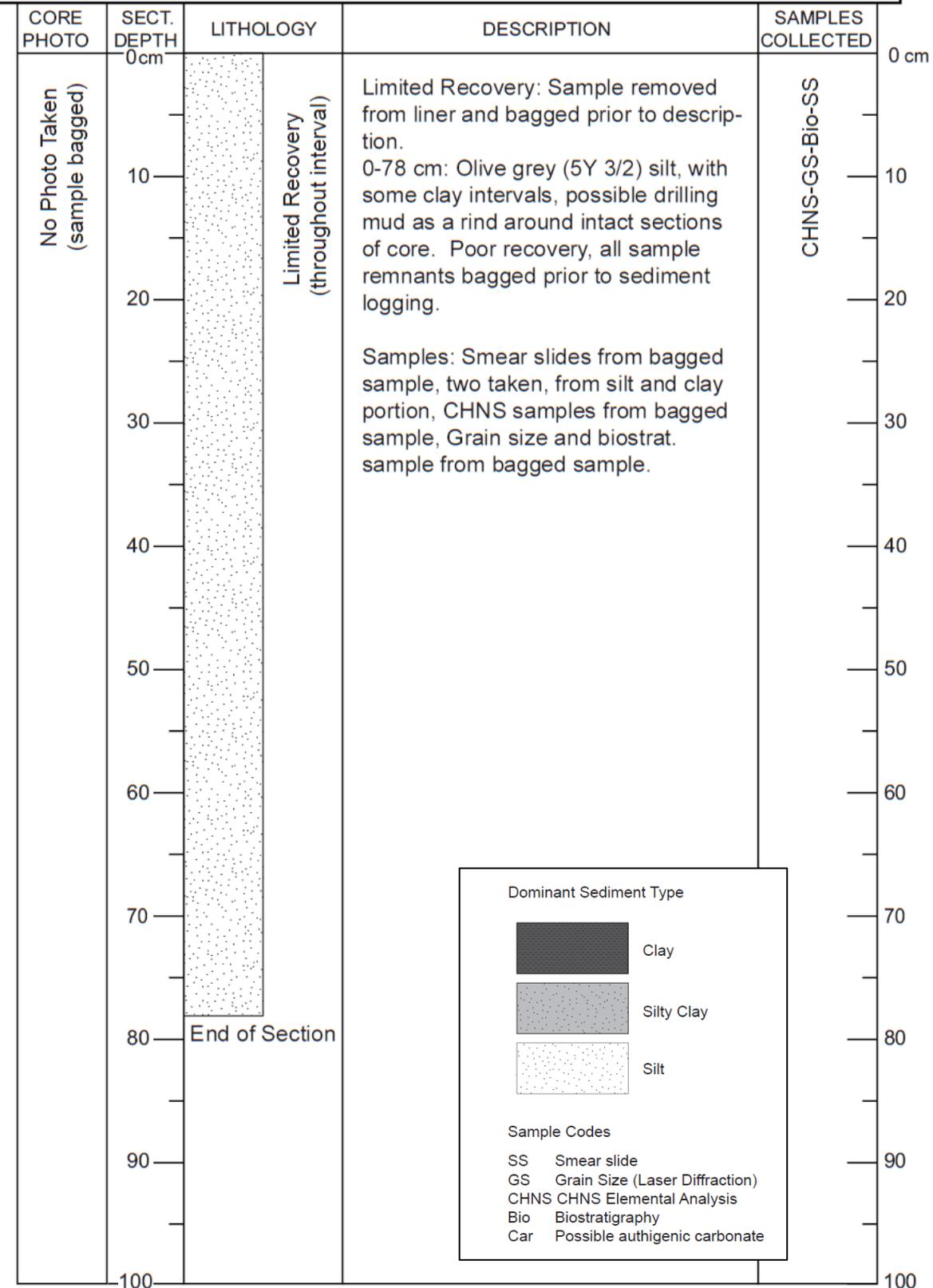


Figure 15: Lithostratigraphic Summary Log of GC 955-H002-8CS-3 (157-235cm) Limited Recovery.

UT-GOM2-1- CORE SEDIMENTOLOGY/STRATIGRAPHY  
 Core ID: H002-8CS-4, 272-315 cm, logged as 0-42 cm

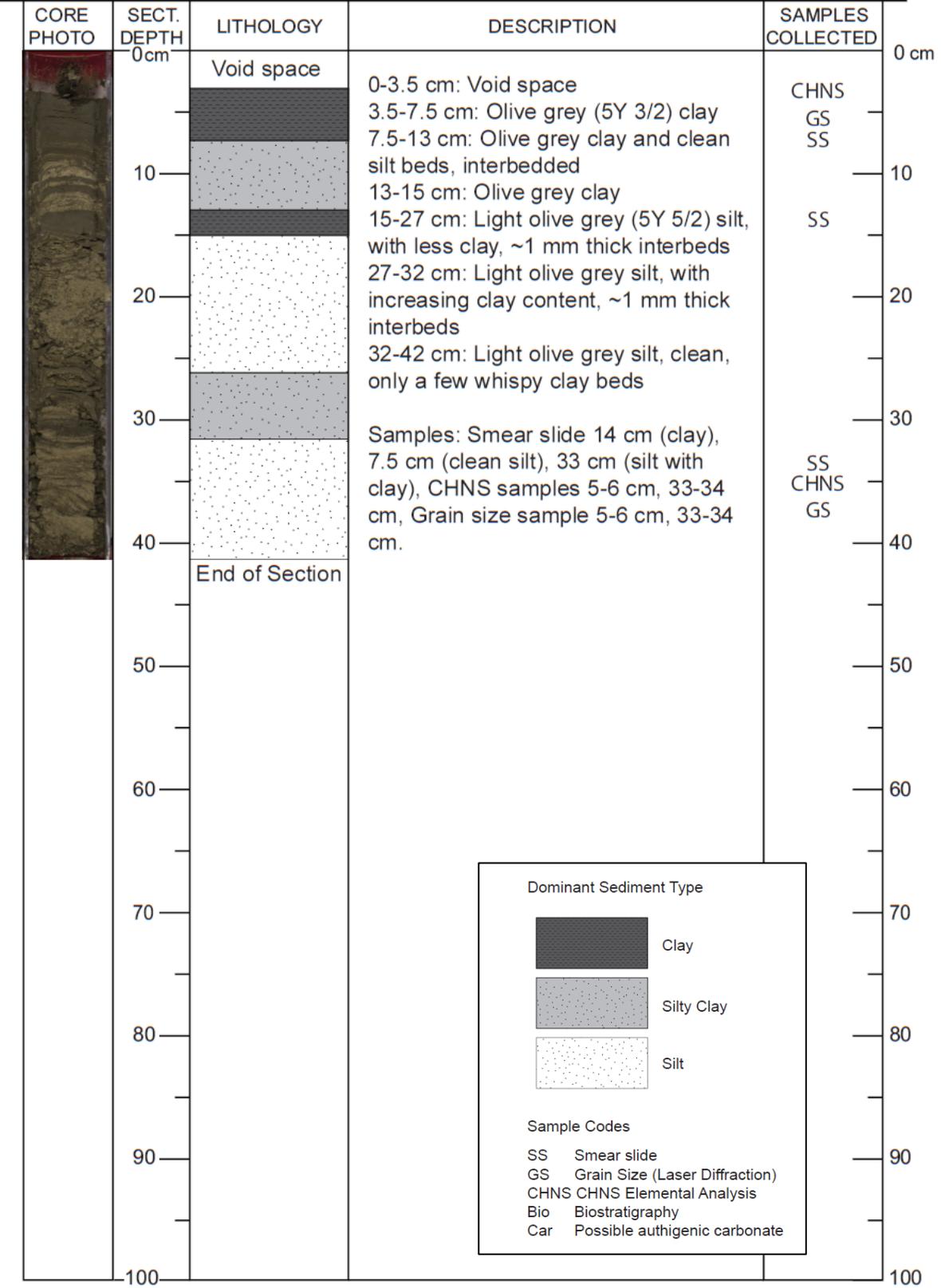


Figure 16: Lithostratigraphic Summary Log of GC 955-H002-8CS-4 (272-315cm) logged as 0-42 cm.

UT-GOM2-1- CORE SEDIMENTOLOGY/STRATIGRAPHY

Core ID: H002-8CS-5, 315-352 cm, logged as 0-36 cm

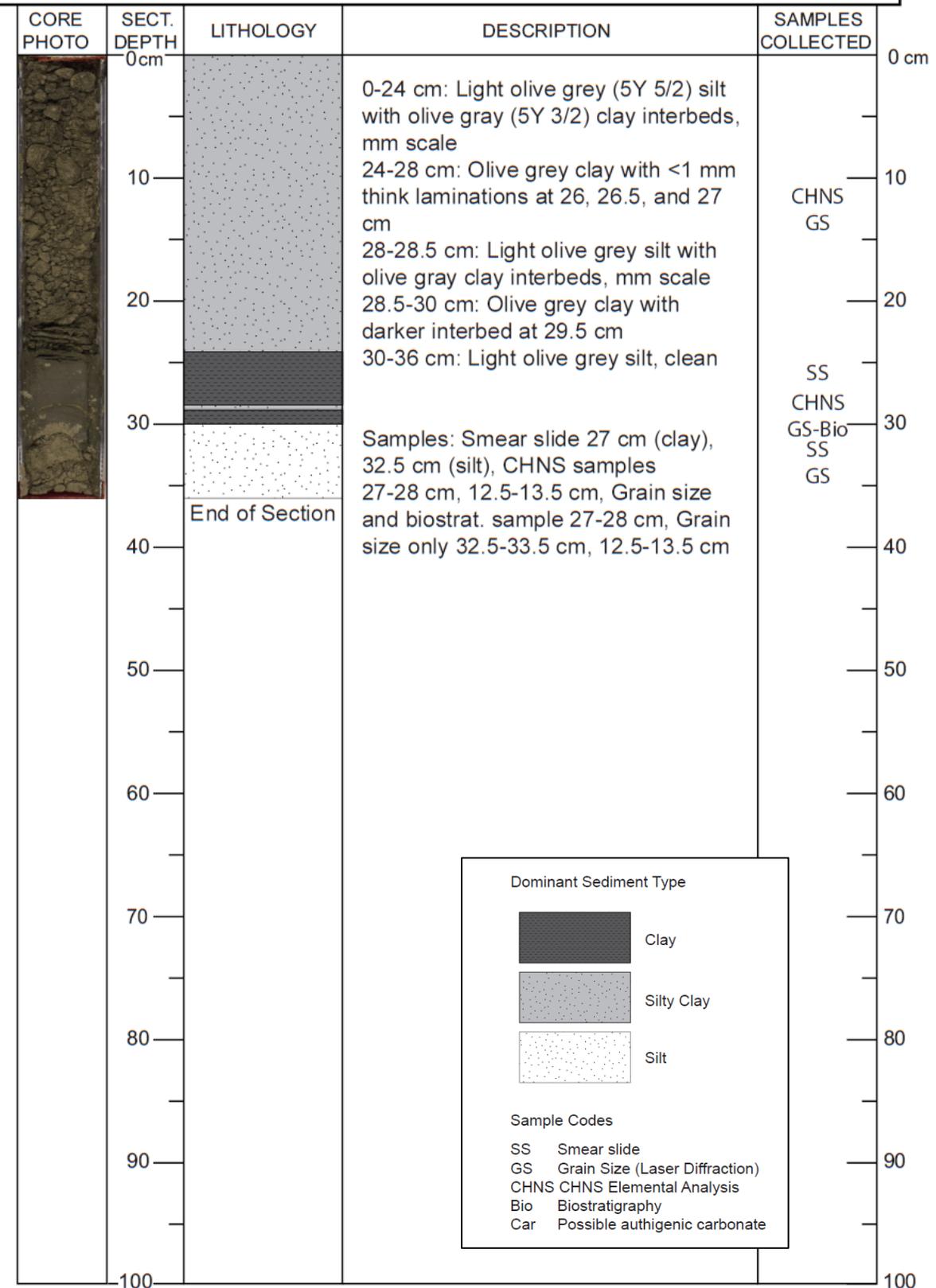


Figure 17: Lithostratigraphic Summary Log of GC 955-H002-8CS-5 (315-352cm) logged as 0-36 cm.

UT-GOM2-1- CORE SEDIMENTOLOGY/STRATIGRAPHY  
 Core ID: H005-9FB-1, 0-18 cm, logged as 0-23 cm

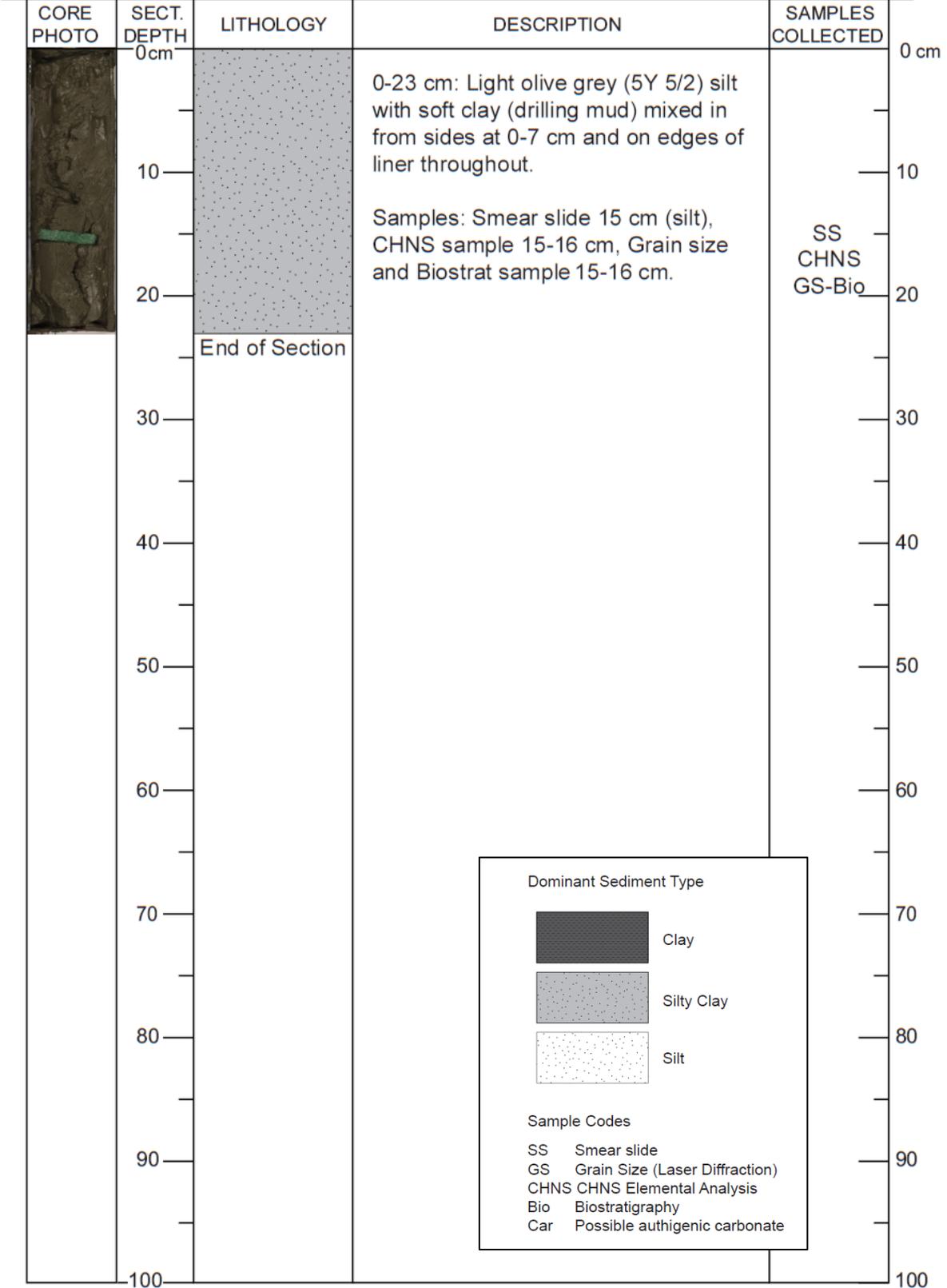


Figure 18: Lithostratigraphic Summary Log of GC 955-H005-9FB-1 (0-18cm) logged as 0-23 cm.

UT-GOM2-1- CORE SEDIMENTOLOGY/STRATIGRAPHY

Core ID: H005-9FB-2, 53-138 cm, logged as 0-87 cm

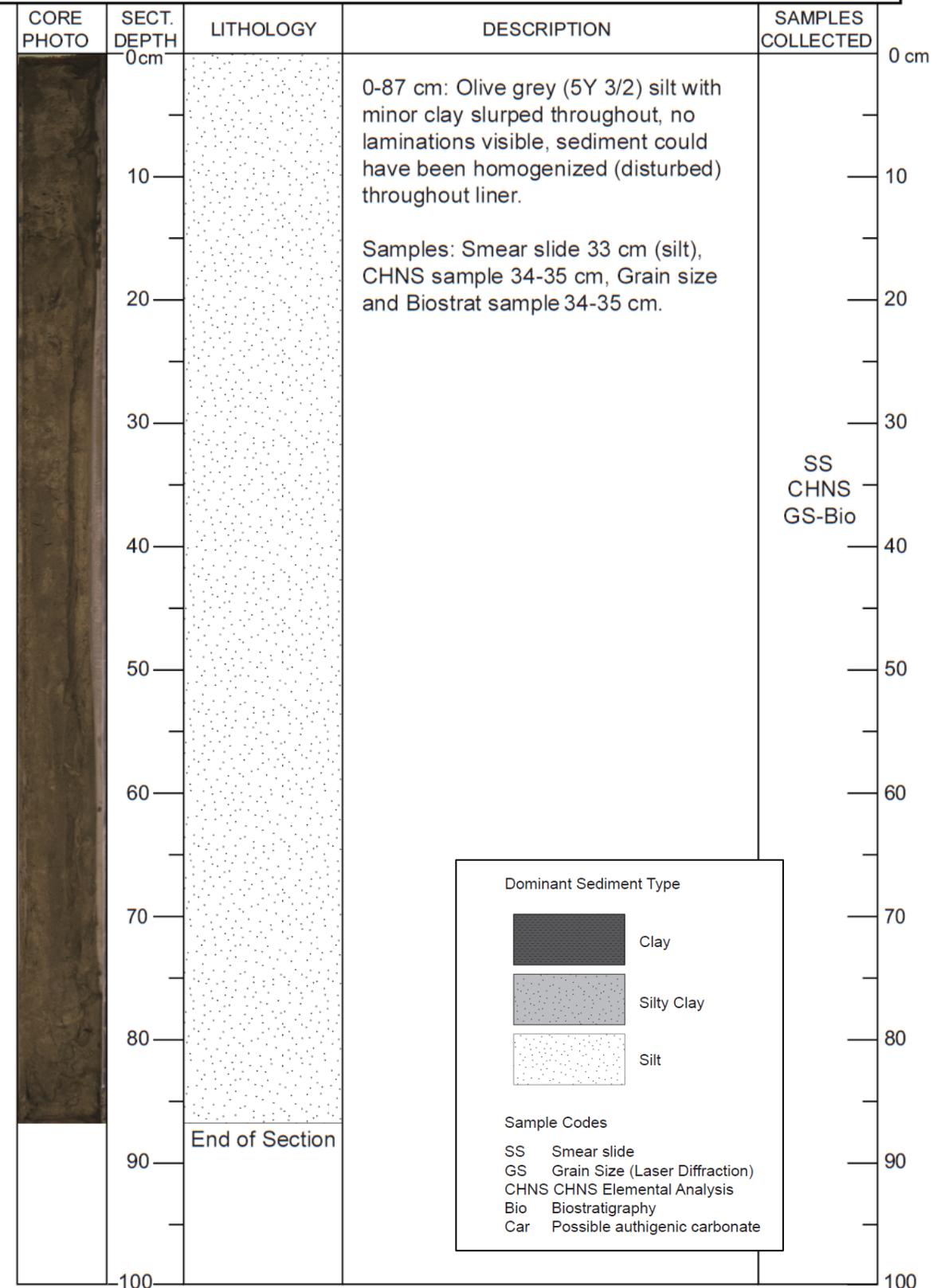


Figure 19: Lithostratigraphic Summary Log of GC 955-H005-9FB-2 (53-138cm) logged as 0-87 cm.

UT-GOM2-1- CORE SEDIMENTOLOGY/STRATIGRAPHY

Core ID: H005-9FB-4, 258-271 cm, logged as 0-18 cm

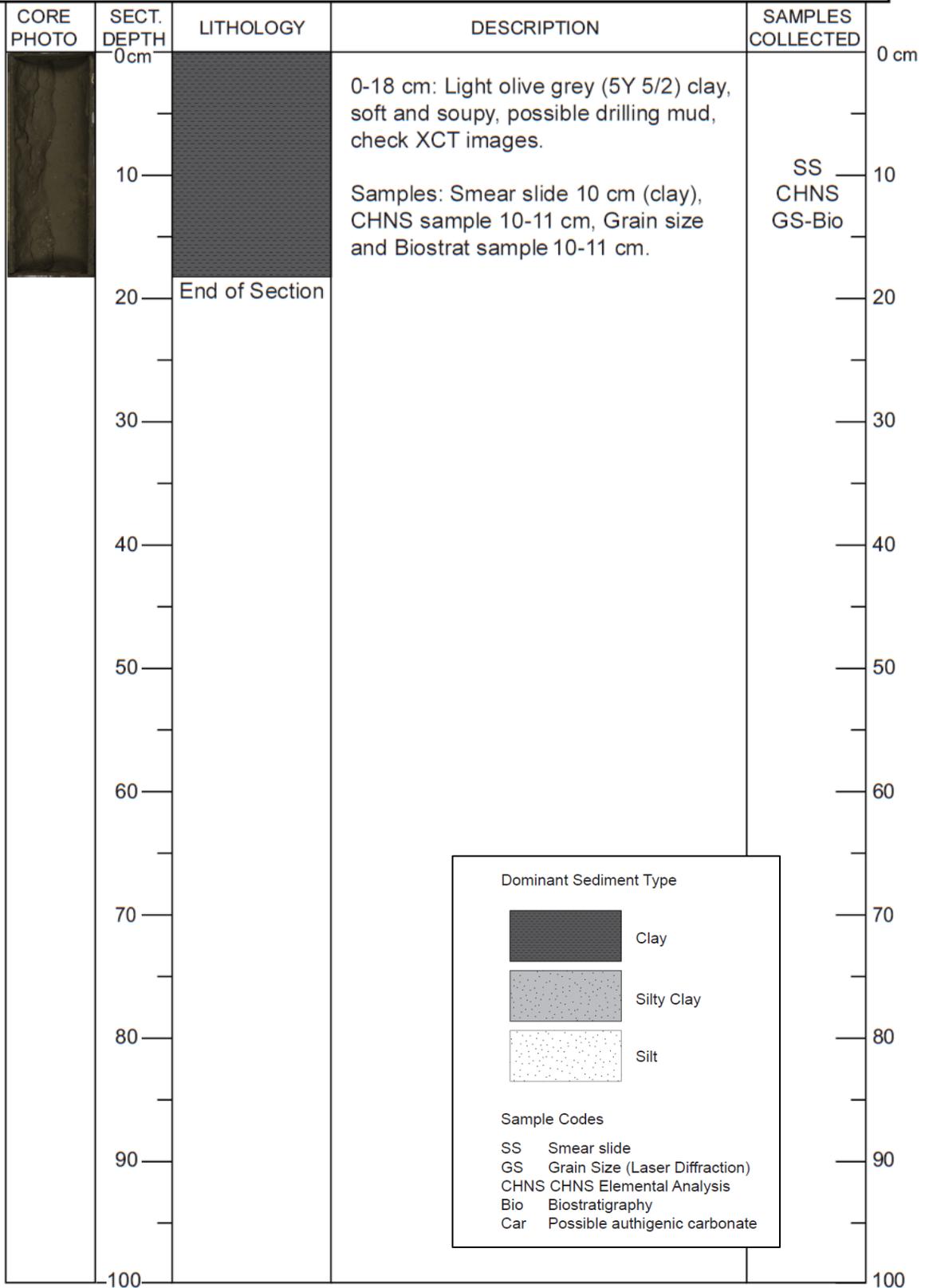


Figure 20: Lithostratigraphic Summary Log of GC 955-H005-9FB-4 (258-271cm) logged as 0-18 cm.

UT-GOM2-1- CORE SEDIMENTOLOGY/STRATIGRAPHY

Core ID: H005-9FB-4, 282-317 cm, Limited Recovery

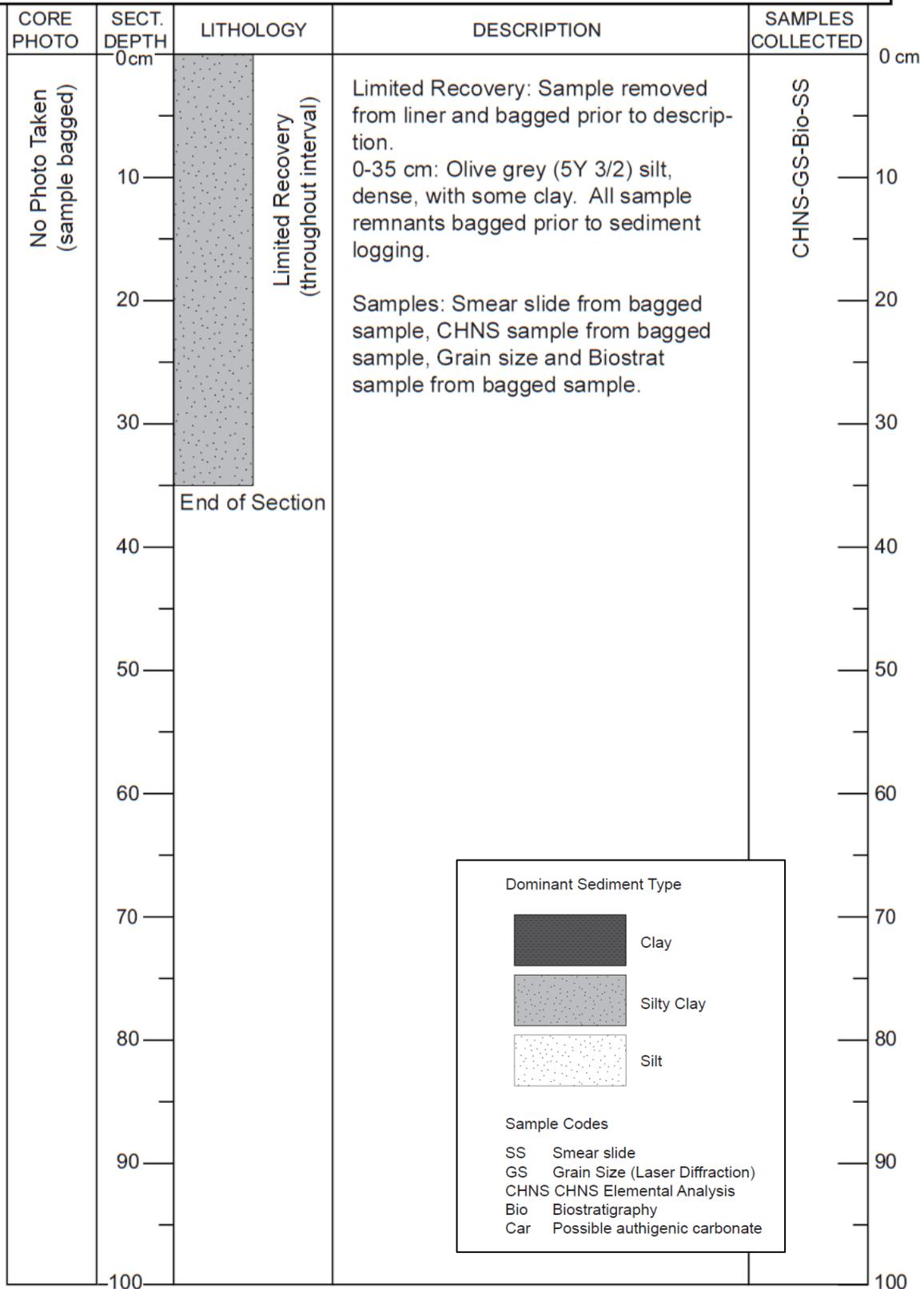


Figure 21: Lithostratigraphic Summary Log of GC 955-H005-9FB-4 (282-317cm) Limited Recovery.

UT-GOM2-1- CORE SEDIMENTOLOGY/STRATIGRAPHY  
 Core ID: H005-12FB-1, 0-12 cm, logged as 0-12 cm

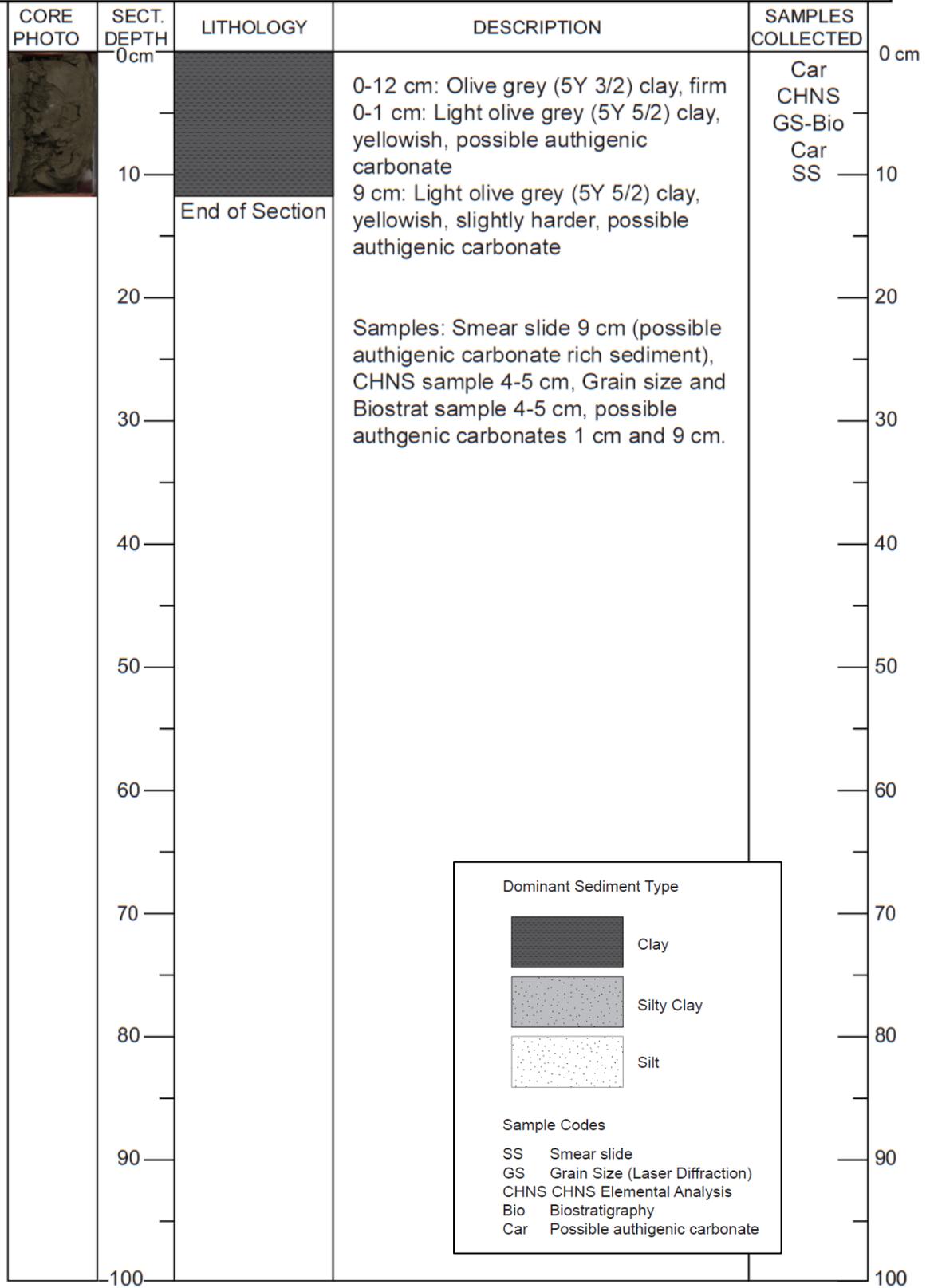


Figure 22: Lithostratigraphic Summary Log of GC 955-H005-12FB-1 (0-12cm) logged as 0-12 cm.

UT-GOM2-1- CORE SEDIMENTOLOGY/STRATIGRAPHY

Core ID: H005-12FB-2, 12-30 cm, logged as 0-31 cm

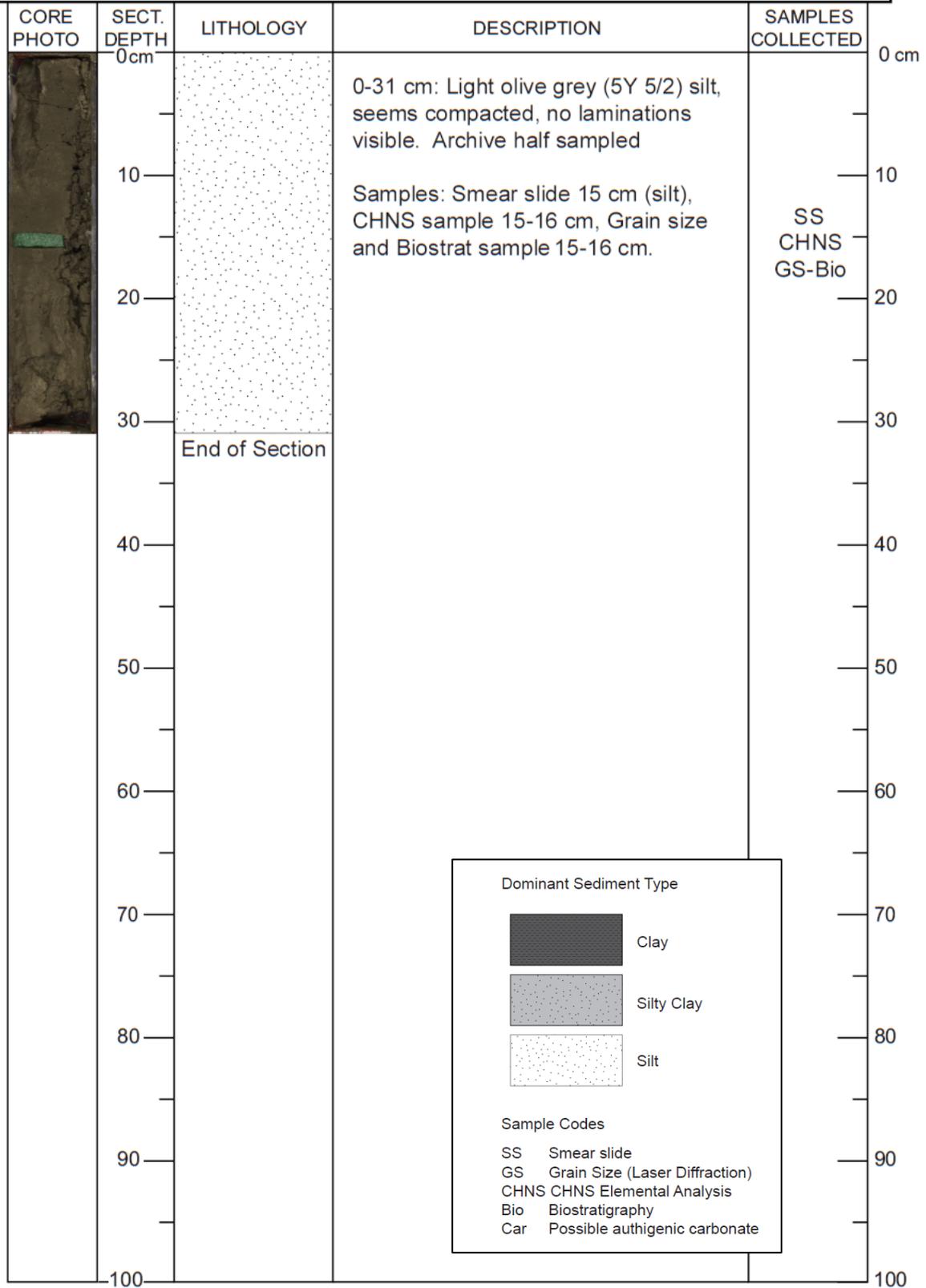


Figure 23: Lithostratigraphic Summary Log of GC 955-H005-12FB-2 (12-30cm) logged as 0-21 cm.

UT-GOM2-1- CORE SEDIMENTOLOGY/STRATIGRAPHY  
 Core ID: H005-12FB-3, 76-140 cm, logged as 0-64 cm

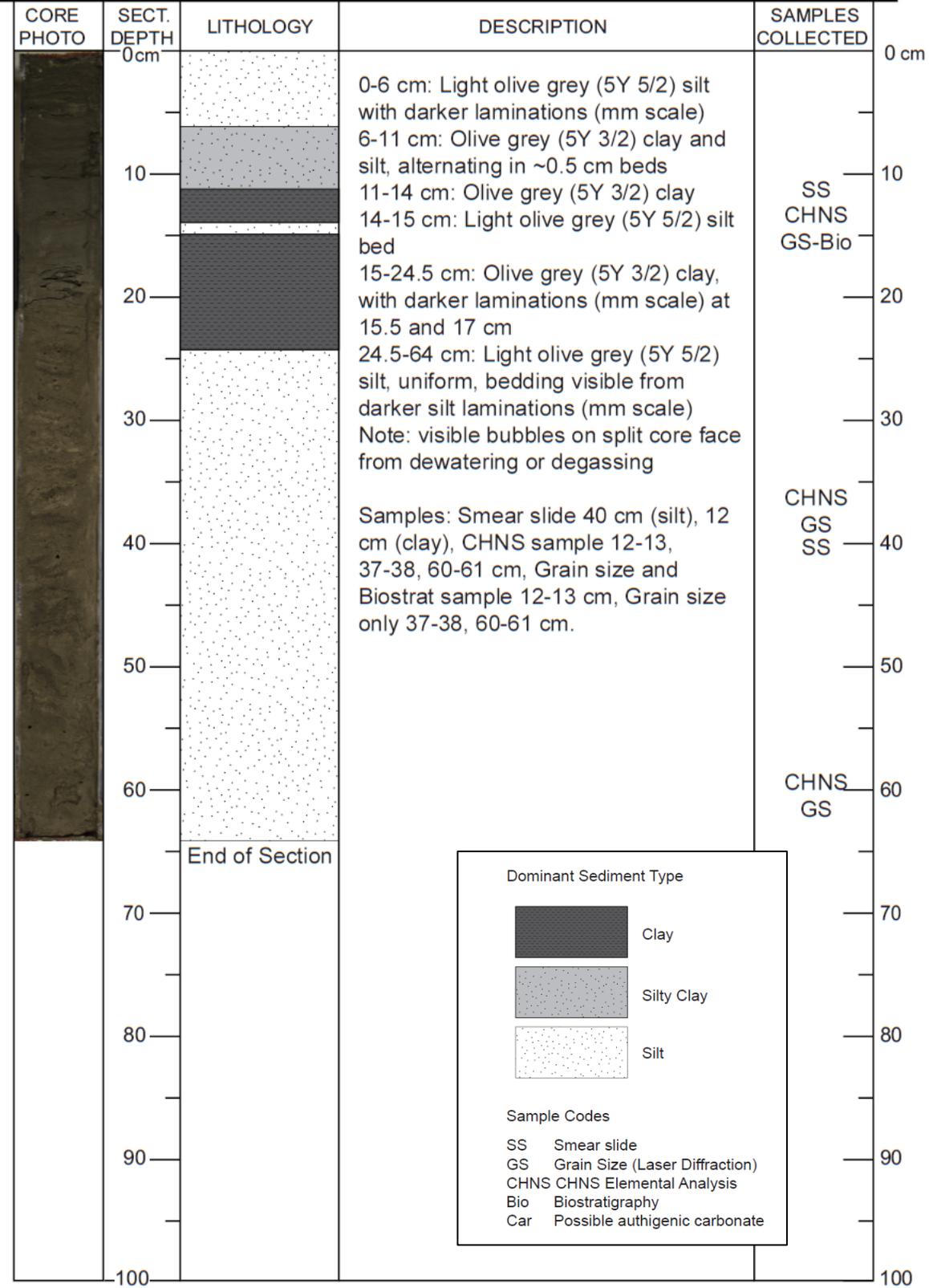


Figure 24: Lithostratigraphic Summary Log of GC 955-H005-12FB-3 (76-140cm) logged as 0-64 cm.

UT-GOM2-1- CORE SEDIMENTOLOGY/STRATIGRAPHY  
 Core ID: H005-12FB-Bonus 1-0-60 cm, logged as 0-60 cm

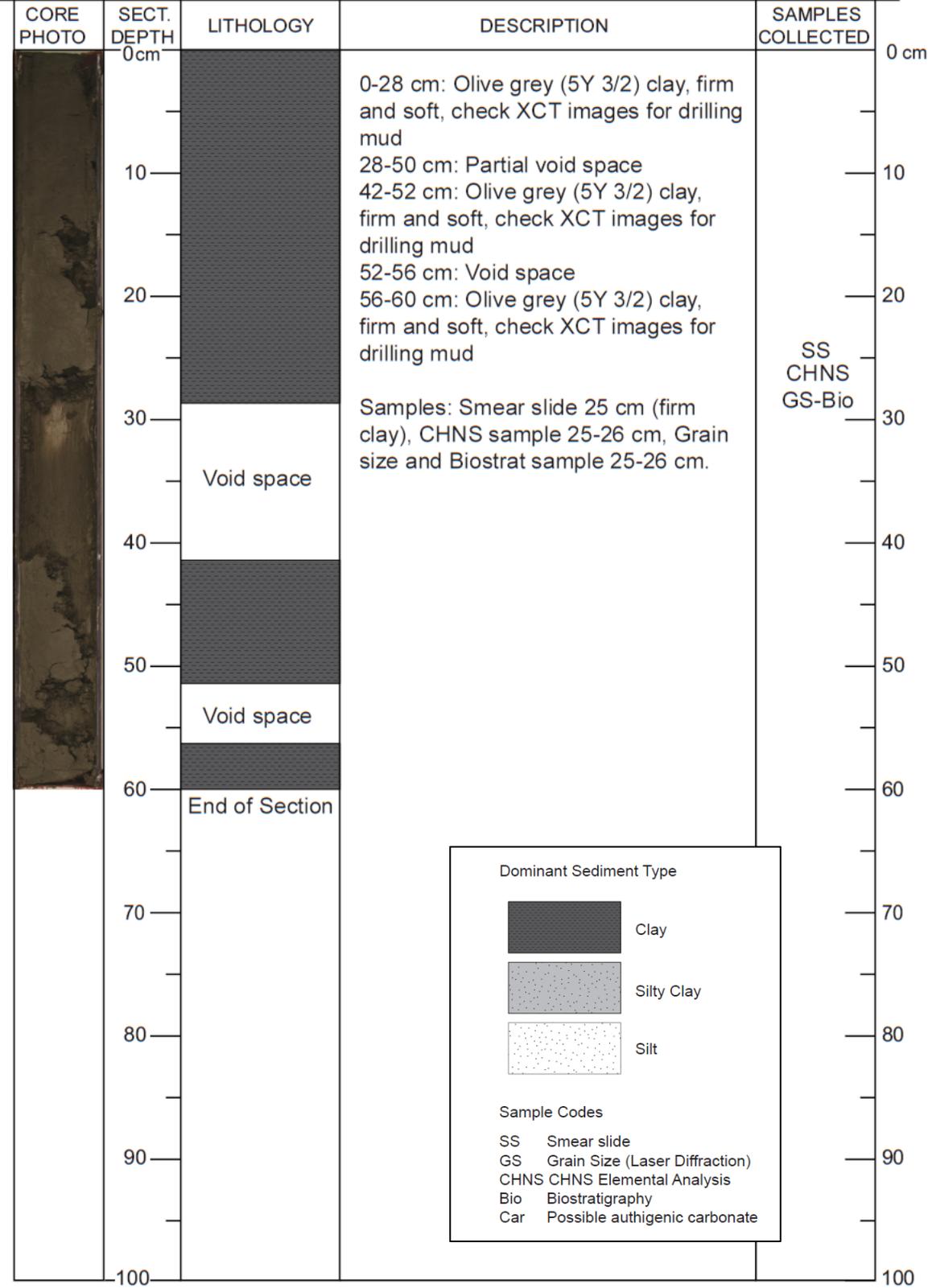


Figure 25: Lithostratigraphic Summary Log of GC 955-H005-12FB-Bonus-1 (0-60cm), logged as 0-60 cm.

UT-GOM2-1- CORE SEDIMENTOLOGY/STRATIGRAPHY  
 Core ID: H005-12FB-Bonus 2-60-160 cm, logged as 0-99.5 cm

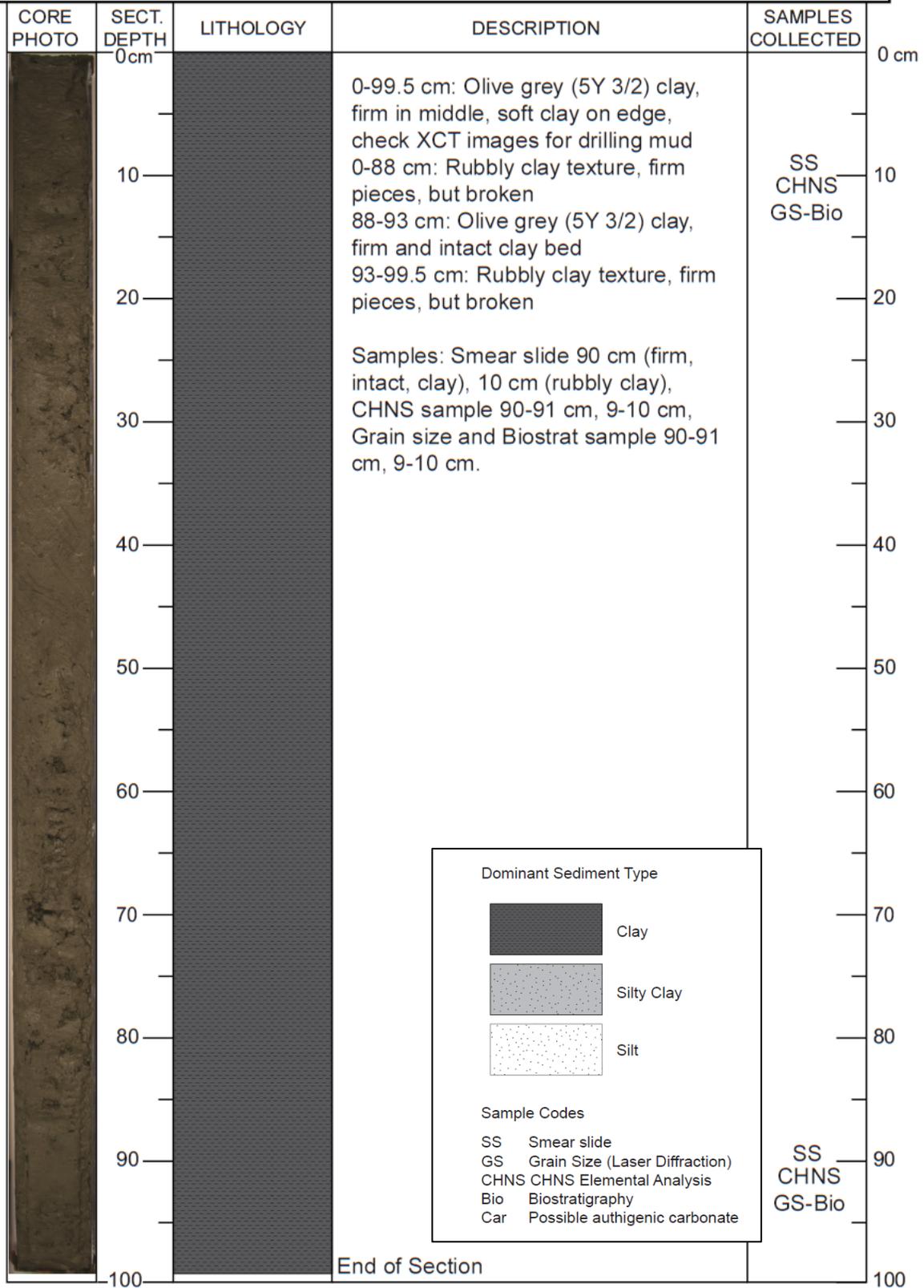


Figure 26: Lithostratigraphic Summary Log of GC 955-H005-12FB Bonus-2 (60-160cm) logged as 0-99.5 cm.