S1. Excavation JSG can be subdivided into 16 segments (Fig. 1). Segments are numbered in reversed order according to the strata first excavated (top segment = #1 and bottom-most segment = #16).

	Sediment	**Interpretation (remarks)**
General observations	- Sediments are generally coarsening- and thickening-upwards. - Clam shrimp occur throughout the section, mostly forming pavements on top of consecutive layers. Some are scattered within the sediment matrix. - Gentle dip of strata (3-4°) with a variable but generally eastward direction. - Thin tuff horizons of µm to cm-scale intercalated throughout Bed 2. Fewer in Bed 3. Thicker units are marked in the litholog of Fig. 1. - Meiofaunal bioturbation in Bed 3.	- Increasing energy level from base to top. - Repeated volcano eruptions. - The mostly undisturbed silty claystones of Bed 2 correspond to environments below storm wave base. - The onset of Bed-3 sedimentation was probably not synchronous throughout the lake. - Lake floor fully oxygenated during Phase 3. - Reworking in upper part of Bed 3 (segments 1 and 2).
Bed 2		
Segment 16	- Alternation of several mm- to cm-thick tuff layers and brownish-blackish mudstone rich in plant debris.	- Distal facies. The storm wave-base did not reach the basin floor. - The dark colour indicates less weathered conditions.
Segment 15 (Horizons AP-AN)	- µm-thick, allochthonous siliciclastic laminae, tuffaceous. - Occurrence of fish fossils within a slump horizon.	- Distal facies. The storm wave-base did not reach the basin floor.
Segment 14 (Horizons AL, AM)	- Heterogeneous sediments. - Pseudoripples between JSG AL and JSG 8ii. - Horizontal burrow system infilled with tuff. - Organic-rich fibrous gypsum layer.	- Pseudoripples resulted from quick tuff deposition.

Segment 13 (Horizon AK)	- Alternation of µm-thick, allochthonous siliciclastic laminae and calcareous mudstones.	- Distal facies. The storm wave-base did not reach the basin floor.
Segment 12 (Horizon AJ)	- Wavy-bedded laminae. - There is a 1 cm thick wood layer in association with fibrous gypsum (also 1 cm thick).	- The wavy structures were generated through load-derived deformation after fast sedimentation of the overlying tuff horizon.
Segment 11	- Ash-tuff layer.	- Volcano eruption.
Segment 10 (Horizons AI-AD)	- µm-thick, allochthonous siliciclastic laminae, tuffaceous.	- Distal facies. The storm wave-base did not reach the basin floor.
Segment 9	- Alternation of tuff and reworked material. - Transition from segment 10 to 9 marked by possible desiccation cracks.	- Possible explanation for the desiccation cracks: Lake Sihetun has been interpreted as a caldera lake by Jiang *et al*. (2011). The proposed rapid shallowing of the lake might have been a consequence of the filling of a magma chamber and the resultant formation of a topographic high within the centre of the lake.
Segment 8 (Sedimentological transition)	- Finely laminated layers that are associated with prominent organic layers made up of wood fragments and plant remains. - Cm-thick fibrous gypsum layers are associated with the organic layers. They are not stratiform.	- Gypsum layers are interpreted as secondary products of sulphide (pyrite) oxidation. - A lack of root horizons is indicative of an allochthonous origin of the plant material.
Bed 3		
Segment 7 (Horizons AC-P)	- Regular alternation of bioturbated, normal-graded siltstone and claystone. - 10.5 cm thick slump horizon.	- Oxic environment.
Segment 6 (Horizons O-F)	- Normal-graded µm to mm-thick, fine sandstone to siltstone. Layers are notably thicker than those of segment 7. - Channel fills occur.	- Increased grain size and sediment thicknesses imply shallowing.

Segment 5 (Horizon E)	- Tuff intercalated with wavy-bedded tuffaceous mudstone.	- Volcano eruption.
Segment 4 (Horizon D)	- Same as segment 3, but finer.	- Shallowing.
Segment 3 (Horizons A-C)	- Alternation of graded sandstone beds (0.2-5 cm thick) and claystones. - Collapse structures.	- Shallowing.
Segment 2	- Interbedded normal-graded sandstone (Fsst < 1.9 cm thick) and siliciclastic mudstone. The basal parts of the sandstone layers are marked by mm-long mud clasts of the same grain size as the underlying mudstone. - Sandstones are cross-bedded forming channels. - The base of segment 2 is marked by a concretionary layer. Concretions are oblate and cm-thick.	- High energy levels. - Proximal position near a river mouth. - Mud clasts indicative of reworking events.
Segment 1	- Normal-graded fine sandstone to siliciclastic mudstone, interbedded with sandstone layers. The basal parts of the sandstone layers contain mm-long mud clasts. - Scattered wood fragments. - Single layer with aligned cm- to dm-scale flute casts.	- Sedimentary structures indicate comparatively high energy levels associated with currents.