



Topography of upper-flow-regime bedforms within sediment gravity flow deposits inferred from lateral variation of spaced planar lamination: an example from the Neogene Aoshima Formation, Miyazaki Group, southwest Japan

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In sediment gravity flow deposits, lateral transitions of sedimentary structures over several metres to several kilometres, caused by changes in bedforms, have commonly been observed. In particular, a sediment gravity flow at upper flow regime stage can cause a lateral transition in sedimentary structures that reflects long-wavelength cyclic steps. However, the limitations of outcrops often inhibit the observation of sedimentary structures with long wavelengths. The Neogene Aoshima Formation, Miyazaki Group, Kyushu Island, southwest Japan, consists of sediment-gravity flow deposits emplaced at offshore of a fan-delta. These deposits are well exposed along the palaeocurrent direction, so providing us with a rare opportunity for tracking the lateral transitions in sedimentary structures. In this study, we analysed transitions of sedimentary structures lamina by lamina over about 10 to 150 metres laterally.

The sediment gravity flow deposits of the Aoshima Formation are characterized by the predominance of spaced planar laminations (SPL), which have been interpreted as deposits of “traction carpet.” These show lateral changes in three patterns; (1) repetition of sets of parallel-laminated SPL and ill-defined SPL, (2) parallel-laminated SPL transitions to prograding sets of SPL, and (3) repetition of the set of parallel-laminated SPL and HCS- or SCS-like structures. In pattern (1), the set repeats over a 10 to 40 m distance, which suggests the existence of bedforms with long wavelengths, such as antidunes. In pattern (2), the parallel-laminated sets of SPL gradually thin in the downcurrent direction. These are conformably overlain by sets of SPL that show a clinoform at the downcurrent end infilling the space over the previous depositional topography. In pattern (3), on the other hand, abrupt thinning of parallel-laminated SPL is observed, and the discontinuities in these parallel-laminated SPL have been filled with SCS- and HCS-like structures.

Lateral changes of sedimentary structure in sediment-gravity flow deposits of the Aoshima Formation suggest that flows in upper flow regime, which can deposit SPL, were affected by pre-existing self-organized depositional topographies, and thus, the sedimentary structures in these deposits change over several tens of metres to one hundred metres.