

Conditions for development of depositional submarine channels: examination by flume experiments

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Although submarine channels are ubiquitously observed in various submarine fans, it is also known that submarine fans lacking continuous leveed channels are common depending on regions. However, the governing parameters to determine this diversity in developments of leveed channels has not been clarified yet. This is because there has been no previous researches that successfully reproduced depositional leveed channel topography in experimental flumes. Therefore, the formative conditions of depositional submarine channels have not been clarified yet. Here, we conducted flume experiments, aiming to reproduce depositional submarine channels for understanding their formative conditions. As a result, we succeeded to form experimental topography that resemble natural depositional submarine channels showing a ceiling river structure with levees in all five experiments. Comparing the experimental topography with the actual submarine fans, the relative depth of the experimental channel was slightly shallow, but features such as the spatial variation of the channel width showed similar trends to those of the actual submarine channels. Thus, we imply that purely depositional submarine channels can be formed without presence of precursor of erosive features. Furthermore, experimental conditions of this study were in the region where the previous study predicted that submarine channels cannot be formed, suggesting that further investigation is needed to discover the governing parameters for developments of submarine leveed channels.

Keywords: turbidity currents, flume experiment, submarine fan