



## **Origin and Dynamics of Depositionary Forearc Margins**

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Depositionary forearcs are built by terrigenous sediments that never reach the axis of a trench. It has been usually thought that at subduction zones, terrigenous sediments shed from the continent drape the upper plate slope, accumulate in aprons or forearc basins, and can easily reach the trench as turbidites or mass slope deposits.

Here we propose a new framework for forearc evolution that focuses on the potential feedbacks between subduction tectonics, sedimentation and geomorphology that take place during an extreme event of subduction erosion, such as the onset of subduction of a major aseismic ridge. There subduction erosion has the potential to rapidly remove the upper plate basement, and replace it from above by rapidly redeposited sediments. This feedback can lead to the creation of “depositionary forearcs”, a forearc structure that extends the traditional division of forearcs into accretionary vs. erosive subduction margins, and which emphasizes the dynamic evolution processes at these margins.

We need to further recognize that subduction forearcs are usually shaped by interactions between slow long term processes and severe punctuated events reflecting the sudden influences of large-scale morphological variations in the incoming plate. Both types of processes contribute to the large-scale morphology of the forearc, with sudden events associated with a replacive depositionary mode that can suddenly create a sub-section of a typical forearc margin.