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Sedimentary gravity flows from subaerial fan-deltas in Loreto Bay, Baja California Sur, Mexico

José O. Navarro-Lozano, Enrique H. Nava-Sánchez, and Lucio Godínez-Orta
INSTITUTO POLITECNICO NACIONAL, CICIMAR, OCEANOLOGY, La Paz, México (52+612)1225322)

Fan-deltas from Loreto Bay show recent evidences of sedimentary gravity flows as a result from catastrophic events during hurricane rainfalls. The knowledge of hydrological characteristics of these flows is important for understanding the effects of storms on fan-deltas geomorphology in this region, as well as for the urban developing planning of the city of Loreto in order to avoid hazardous zones.
The analysis of precipitation and hurricane tracks data for the period 1945 to 2009 indicates that hurricanes have caused catastrophic floods every 20 years. Stratigraphy from the channel incision shows a sequence of stream flow and debris flow controlled by changes in the competence and capacity of the stream, which are associated to the gentle slope (<2 °) of the fan-deltas. However fans from the north of the bay (Arce and Gúa) show deposits of debris flows associated to catastrophic floods, which have caused the incision channel to drift towards the southern part of the fans, while flows from Las Parras fan-delta, from the middle of the bay, are dominated by stream flows. These differences in the type of the flows are controlled by lithology, shape and size of the drainage basin, and slope of the transit zone in the feeder channel.