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Effects of landscape-mantling volcaniclastic deposits on the evolution of marine sedimentary environments off the Amalfi coast (SW Italy)

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The interpretation of very high resolution seismic profiles and gravity core data acquired on the continental shelf of the Amalfi coast (Northern Salerno Bay) documents the stratigraphic architecture of a series of small fan-deltas that develop at the mouth of major bedrock streams. The fan-delta system mostly postdates the Plinian eruption of the Vesuvius of AD 79 and displays various phases of development that were ostensibly associated with periods of high sediment supply from the adjacent river basins. During these periods landscape-mantling loose pyroclastic deposits (mostly air-fall tephra erupted by the Vesuvius) were quickly eroded and delivered to the continental shelf by sheet wash and flash floods events. Depositional processes on the foresets were dominated by sediment gravity flows originating from hyperpycnal river flow and pyroclastic fall deposits. This created, in turn, favourable conditions for seafloor instability, soft sediment failure, slumping and sliding that characterize the deltaic stratigraphic architecture.
Sesimic interpretation showed that most of the gravity-driven instability structures are not diffused across the fan-delta but indeed concentrated on a few stratigraphic horizons that invariably correspond to major tephra layers or tephra clusters. This observation, coupled with the recognition that the sediment supply to the fan-delta system is largely affected by high-energy river floodings suggests a direct relationship between the rates of erosion of the river basin slopes that follow deposition of landscape-mantling volcaniclastic deposits and the rates of sediment that are delivered to the fan-deltas.