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Recent sedimentological processes in the Var canyon; results from in-situ measurements and recurrent interface coring

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The Var canyon is located in the Ligurian Sea (NW Mediterranean). This submarine system is still connected to the Var River so directly receive its sediment load. It can be affected by several gravity processes, like hyperpycnal currents (initiated by floods) and ignitive turbulent surge (initiated by sediment destabilization).

In the framework of the HERMES European Project, the aim of this work is to characterise the recent hydrological and sedimentary processes in the Var canyon (NW Mediterranean). Acoustic data (side-scan sonar imagery and multibeam bathymetry) and seafloor sampling including interface cores collected during ENVAR 1, 2, 3 and 4 allow us to make a reconstruction of the geographical and temporal variability of the environments. Excess of 210Pb gives us the stratigraphy of the infra-centennial deposits.

From previous works, we know that the canyon floor is a pathway for sediments and shows a wide range of deposits. It consists on old gravel to cobble-size clasts shaped into sediment waves. On the upper part, muddy sediments can partially fill the interdunes. On the middle valley, theses gravels can appear trough large scours, but are caped by great areas of coarse to fine deposits. In the ENVAR interface cores, recent deposits are composed by fine sand to muddy sediments. Their thickness is variable according to location. Actual sedimentation on the floor seems to be episodic, local, and unsustainable. In the canyon and the upper valley, terraces reach at 30 to 70 m above channel floor. At the left-hand side, they show many erosion marks on the seafloor.

Sediments are generally made of gravel to coarse silt. Turbiditic sequences are not well defined and erosion contacts are often observed. Sedimentation rates for the late century are around 2 mm per year. The right-hand side terraces show less hydrodynamical bedforms, there are no erosional structures on the seafloor. In cores, sedimentary sequences are well defined, and are composed of coarse sand to silty mud. The sedimentation rate reaches more than 10 mm per year. From all theses observations, it appears that right-hand side terraces are more preserved of the high energetic flows and deposits give us a good record of the hydrodynamical processes. Indeed, sedimentary sequences can generally be discriminated and related to flood or turbulent surge events. Southward to the middle valley floor, the right-hand levee is characterised by a prominence called the Var Sedimentary Ridge. Sediments are composed of coarse silt to mud. Sequences are finer and well preserved. The sedimentation rate is weaker than inside the channel on terraces; it is about 0.8 mm per year.

In order to link all theses deposits with the present hydrodynamical processes (such as Var river floods, or turbidity currents), this study will be compared with moorings dataset. The moorings, deployed all along the canyon, will acquire 2 years time series of particle fluxes and currents.