

The Rhone Fan (Gulf of lions) and the Var ridge (ligurian margin) : Mediterranean turbiditic systems with contrasting architectures and growth patterns

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The comparison of the architecture of the Rhone Fan and Var Ridge, located in contrasting physiographic and tectonic settings of the northern mediterranean margin, emphasizes some of the main factors controlling the deep turbiditic sedimentation.

Despite strong differences in size and in physiographic and tectonic settings, the structure of both turbiditic systems is comparable and is defined by the stacking up of depositional units represented on seismic sections by two main types of acoustic bodies (DROZ and BELLAICHE, 1985; BELLAICHE *et al.*, 1986) which are also recognized in other fans (DAMUTH *et al.*, 1988) :

-the turbiditic lenticular units: they are grouped within larger acoustic bodies, the channel/levee complexes. Within these complexes, the geometry of the stacking of the units evolves downstream and is specific of the different environments of the fans. This type of acoustic bodies is the most frequent and can represent up to 80-90 % of the sediments of the fans

-the chaotic bodies representing mass-movement deposits are much less frequent and seem to be grouped at specific stratigraphic levels of the fan.

The main differences opposing these two fans concern their growth pattern:

-Seismic analyses indicate that sedimentation in the **Rhone Fan** results from (Fig.1):

*periodic **lateral displacements of the depocenters**, which are responsible for the individualisation of the channel/levee complexes. They are most commonly tectonically- or morphologically-induced and can be or not linked to preferential periods of instability.

***longitudinal displacements of depositional area** which are probably mainly eustatically-controlled. Quaternary sedimentation in the Rhone Fan is marked by a general but discontinuous progradation of the turbiditic front, probably reflecting the effects of the quaternary glaciations.

-In contrast, the structure of the **Var Ridge** (highly asymmetrical upper part of a larger turbiditic system, the Var Fan) is apparently more simple: deposition did not significantly suffer **neither lateral** (except for a progressive and local northwards migration of the upper Var Valley) **nor longitudinal displacement**. This structure results from the combination of tectonic and physiographic influence which induced the stability of the depositional area and the overgrowth of the ridge.

The contrasting characteristics of the two fans are presumably related to the difference of intensity with which sea-level variations control deep turbiditic sedimentation. An important parameter that influence the intensity of this factor is the physiographical characteristics of the margin:

-in the first example, the **Rhone Fan**, sedimentation is **primarily controlled by sea-level fluctuations**. The contrasting physiography of the Gulf of Lion (wide shelf and well-expressed shelf break) is highly favourable to a good record of the effects of this factor.

-in the second example, the **Var Ridge**, deposition is **mainly under tectonic and physiographic influence**. Sea-level changes are of much lower influence because of specific morphological characteristics of the ligurian margin: the absence of continental shelf prevents any accumulation on the upper parts of the margin during high sea-levels, and leads to the permanent feeding of the basin.

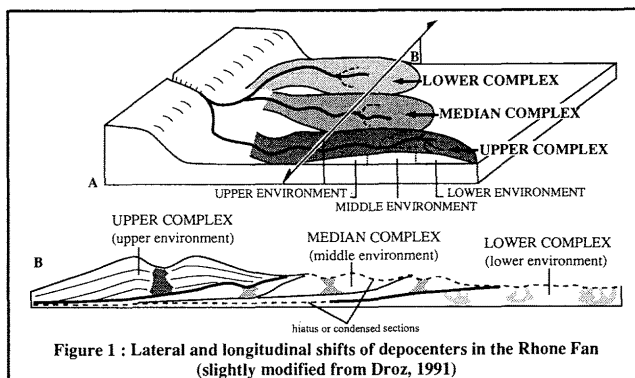


Figure 1 : Lateral and longitudinal shifts of depocenters in the Rhone Fan (slightly modified from Droz, 1991)

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