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INTERNATIONAL MEETING OF SEDIMENTOLOGY

ROME
10 - 13 SEPTEMBER 2019

"SEDIMENTOLOGY TO FACE SOCIETAL CHALLENGES ON RISK, RESOURCES AND RECORD OF THE PAST"

ABSTRACT BOOK

ISBN 978-88-944576-2-9

Seismic anatomy of a mixed turbidite-contourite system in the northern region of the Campos Basin, Brazil

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Sedimentary processes driven by down-slope gravity currents and along-slope contour currents are common phenomena along continental margins and may be distinguished by their flow energy, competency, and duration. However, their distinction in the geological record, either in sedimentary deposits as much as in seismic data, requires complex and detailed analyses. The transition point between the components of mixed turbidite-contourite depositional systems is difficult to determine since both systems exhibit similar sedimentary process involved in the deposition. This work proposes an evolutive model for the Itabapoana system (Campos Basin, Brazil) a structurally-controlled mixed system active from the upper Cretaceous to the Holocene. The system was dominated by turbidity currents and continuously reworked by contour currents on its upper/middle slope section. Cosine Phase and RMS Amplitude seismic attributes were applied to post-stack seismic profiles in order to describe their seismic facies. Coarse-grained, gravity-driven deposits are associated with high amplitude reflections infilling narrow canyon troughs in the upper slope. Mass flows deposits marked by chaotic reflectors are locally intermingled with intra-channel turbidite deposits and are ultimately overlain by low amplitude, continuous, parallel reflectors interpreted as the deposits of the fine-grained sediment suspension load derived from the flow turbulence.An intra-slope gentle terrace marks the passage from middle to lower slope and the widening of the turbidite system axis, with an increment on the thalweg linearity is observed, indicating the transfer of part of that sedimentary load down to the lower slope where salt walls and diapirs pierce the sedimentary column and control the depositional physiography. Expressive coarse-grained deposits are observed with their confined-lobed geometry responding to the salt-dominated seafloor topography. The headless canyon system is originated by the intense bottom current reworking of the shelf edge and upper slope. Recurrent bottom current action in the upper and middle slope is marked by the presence of stacked plastered drifts with long wavelength sediment waves developed in its convex upper surface, occasionally developing a moat system indicating periods of higher intensity bottom circulation. The lack of morphological features of a canyon head and submarine channels on the upper slope is therefore associated to the action of surface and intermediate contour currents in the study area, which were responsible for reworking the gravity sediments, waxing and filling the expected negative relief features. Mixed turbidite-contourite systems, such as the one identified in the northern Campos Basin, can provide great improvement in the petroleum exploratory potential, since coarse sediments (turbidites), a well-known hydrocarbon potential reservoir, are overlain by potential top-seal fine sediments (contour drifts).