This course provides an advanced training for exploration geologists and geophysicists focused on understanding clastic sedimentation in deep-water environments, with an emphasis on its relationship with different geomorphological and tectonic contexts. Throughout this course, classic models that have guided hydrocarbon exploration in deep waters from early times to the latest innovative proposals will be reviewed and discussed. Fundamental concepts (i.e., Bouma, 1962; Mutti and Ricci Lucchi, 1973; Walker, 1978; Mutti, 1992; Posamentier and Kolla, 2003; Mutti et al., 2003; Posamentier and Walker, 2006; Zavala and Arcuri 2016; Mutti, 2024) will be revisited, complemented by selected examples from the Pyrenees (Spain), Neuquén Basin (Argentina), Austral Basin (Argentina), Guárico Basin (Venezuela), and Campos Basin (offshore Brazil) to address the issue from different observation scales.

While traditional models have been pillars in hydrocarbon exploration for the last five decades, it is essential to recognize that most models are based on detailed studies of outcrops located in collisional contexts. Applying these concepts to passive margins requires careful analysis, as sedimentary dynamics can vary significantly between active and passive margins. In passive margins, unique features such as low slope gradients, extensive submarine deltas, incised meandering canyons, gullies, levees, transient fans and lobes, as well as a depositional control guided by channel avulsion, MTCs (mass transport complexes), and diapir growth, define a complex depositional environment. The importance and prediction of these last critical elements will be reviewed through selected examples from seismic, well logs, cores and outcrops.

This course comprises five days of immersive virtual theoretical classes and field activities in the Tierra del Fuego Island. During this field trip, participants will have the unique opportunity to explore the impressive Miocene outcrops of the Austral Basin, enriching their understanding with direct observations and discussions focused on comparing theoretical models with the observed rock characteristics.

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