4-D Evolution of Deepwater Fold and Thrust Belts in Accretionary Wedges

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ABSTRACT

Accretionary prisms are characterised by critically tapered Coulomb wedges with imbricate fans of regularly spaced thrust-related tip-line folds detached on over-pressured shale units. They display dynamic interactions with both syn-tectonic sedimentation as well as syn-tectonic erosion. Modern high-resolution seismic data across these systems has provided new insights into their geometries, fault-fold structures and how they form in space and time. Detailed seismic studies have been combined with scaled analogue modelling of thrust wedges allowing the analysis of how these systems develop in space and time. Examples analysed include the Hikurangi fold and thrust belt offshore New Zealand, the Makran accretionary prism offshore Iran and western Pakistan as well as the Sulawesi fold belt in the Makassar straits. Syn-tectonic sedimentation rates in many of these systems are low and the thrust-related folds are emergent on the sea floor such that gravitational collapse of the frontal limbs of the folds is common. Analyses and reconstructions of these deepwater fold and thrust belts have lead to new models for the development of thrust-related folds in these terranes. The implications for petroleum exploration are discussed.