Local to Regional Controls on Syn-halokinetic Carbonate Platform Growth Within Extensional Tectonic Settings

Dorobek, Steve [1] (1) EPT, BP America, Houston, TX.

Salt structures provide dynamic substrates for carbonate platforms in extensional basins (sags, rifts, and passive margins). The size, thickness, morphology, stratal patterns, internal facies, and diagenetic patterns of individual carbonate platforms that develop during active deformation of underlying salt successions (i.e., 'syn-halokinetic platforms') are mostly dependent on pre-kinematic salt thickness, salt deformation rates, thickness of post-salt/pre-carbonate strata, eustatic changes during platform growth, patterns of coeval siliciclastic sedimentation, and, at more regional scales, the location of platform growth within regionally linked or unlinked salt-deformation systems.

Salt structures in sags and some intrashelf basins along passive margins are dominated by salt diapirs, pillows, and localized extensional fault systems with limited throw. In general, regional salt detachments do not develop because tectonic gradients created by differential subsidence are typically low and outboard basement highs may limit downdip sliding and translation along salt detachments. In wide rift basins and along passive margins, however, where lithospheric stretching is greater, thicker original salt and steeper tectonic gradients trigger more extensive gravity sliding and the development of regional salt detachments. Rafted, widely separated, isolated platforms with internal growth strata that grossly mimic patterns observed in syn-rift carbonate platforms may develop over broad regions within the updip extensional province. Isolated platforms also can develop on turtle structures, as well as land-attached, mixed siliciclastic-carbonate ramps and shelves that usually form after salt-withdrawal depocenters have been filled.

The seaward limit of syn-halokinetic platforms is generally found within the translational province because water depths become too great for shallow-marine carbonate deposition farther basinward. Late-stage gravity sliding, however, may completely 'translate' any previous record of shallow-marine carbonate sedimentation along some margins.