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## **Prograding Steep and High Relief Carbonate Platform Margins**

Seaward progradation of several km's or more has been documented mostly for low-angle carbonate platform slope systems with exponential to sigmoidal slopes and a dominant bank top sediment source. Steep and linear platform slopes generally show minor progradation but two high-rising carbonate platforms with margins that prograded 5 km's or more complete the geometrical spectrum.

The Capitan margin rimmed the Delaware Basin (west Texas and southeastern New Mexico) during the Late Guadalupian (Capitanian). Although the margin was high-relief (300 to 550 m) and steep (30 to over 70° dip), progradation extended the margin from 5 to 19 km. Outcrops of steep, high relief Serpukhovian to Moscovian margins in Spain (analogs for subsurface platforms of the Pricaspian Basin in Kazakhstan) record progradation of more than 5 km despite their high-relief (up to 600 m) and steep (~ 20-28°) nature.

Both examples share a highly productive microbial cement boundstone factory extending from the platform break to nearly 300 m depth and a lower slope dominated by (mega)breccias and grain flow deposits derived from the margin and slope itself. The broad depth range of microbial cement boundstone increases the potential for production during both lowstands and highstands of sea level and thereby facilitates progradation. Rapid lithification of the boundstone provides stability to the steep slopes, but also leads to readjustment through shearing and avalanching. What controls the microbial boundstone formation remains a debate but its presence is a key factor in the progradational geometry of these and possibly other older, and younger, margins.