

Contrasting styles of aeolian, fluvial and marine Interaction in the Cutler Group of the Paradox Basin, SE Utah, USA

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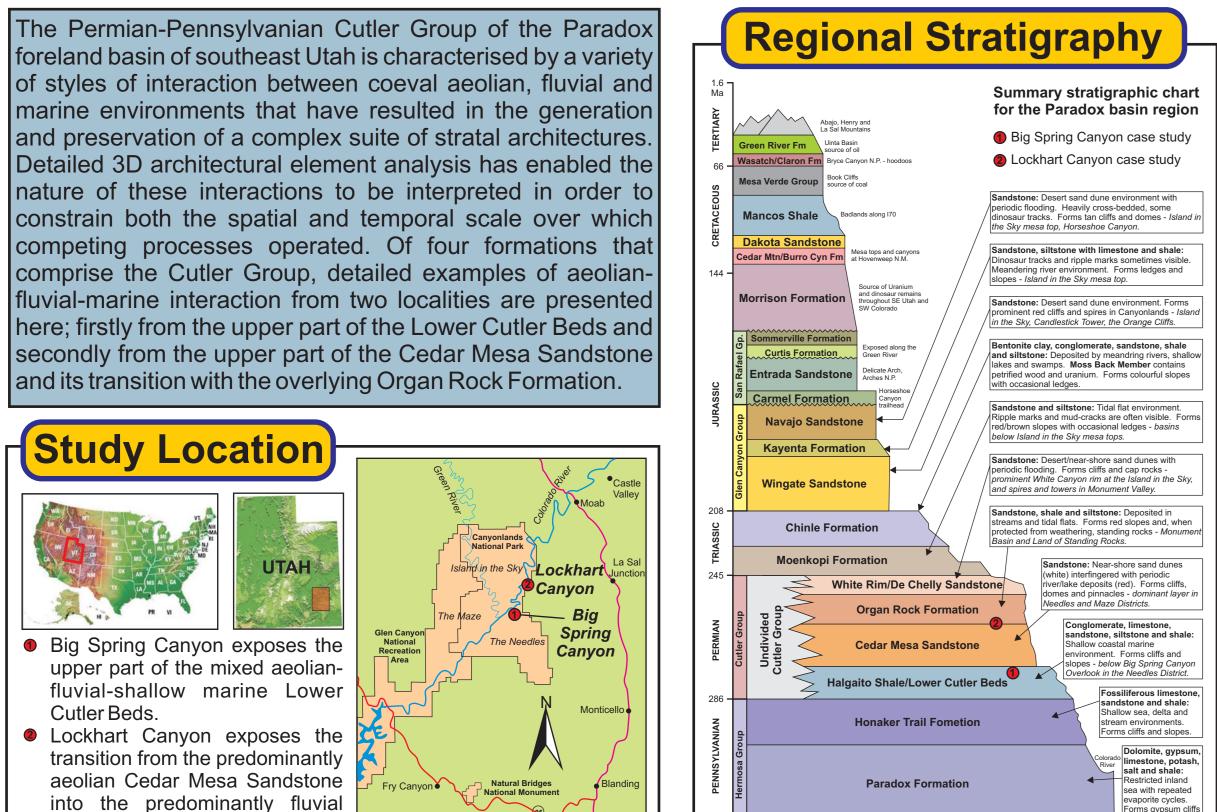
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Case Study 2: Lockhart Canyon



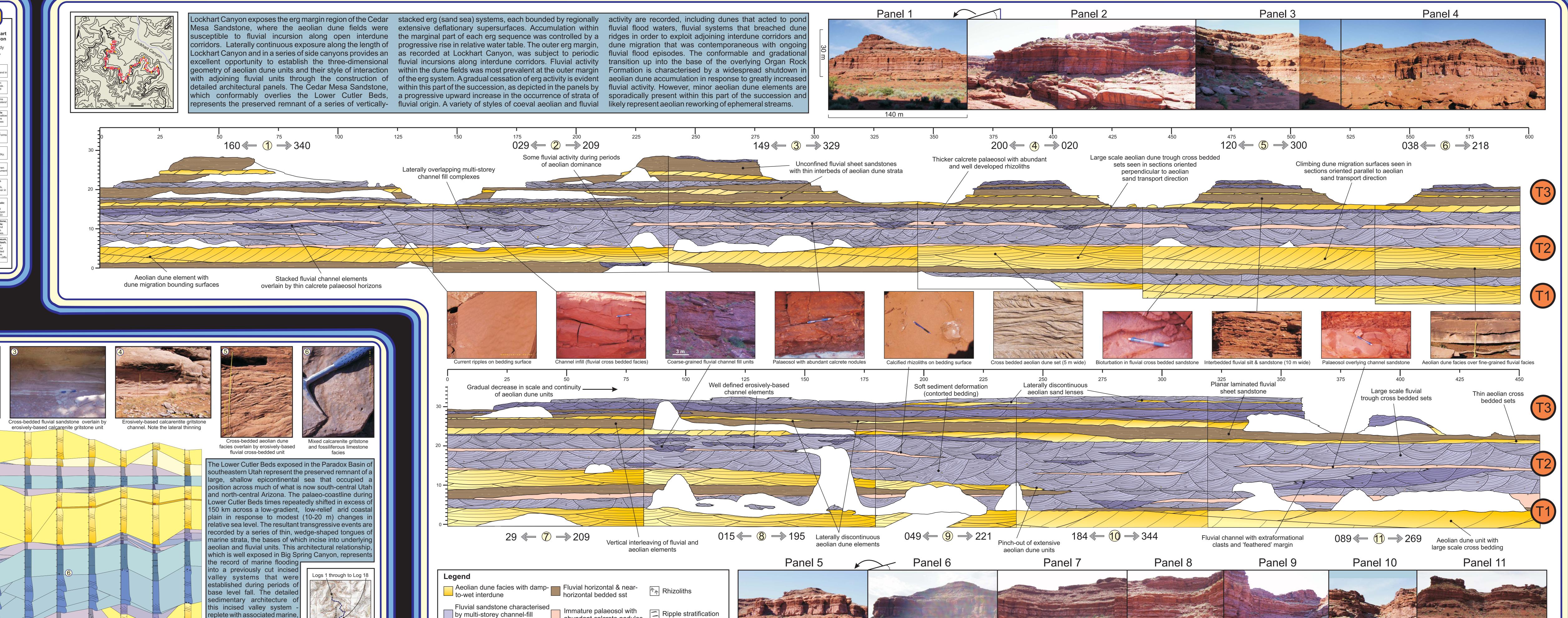
Case Study 1: Lower Cutler Beds

(laminated) sandstone

☴ Flat bedding |ੰ'

Fluvial cross-bedded sandston

Introduction and Geologic Setting



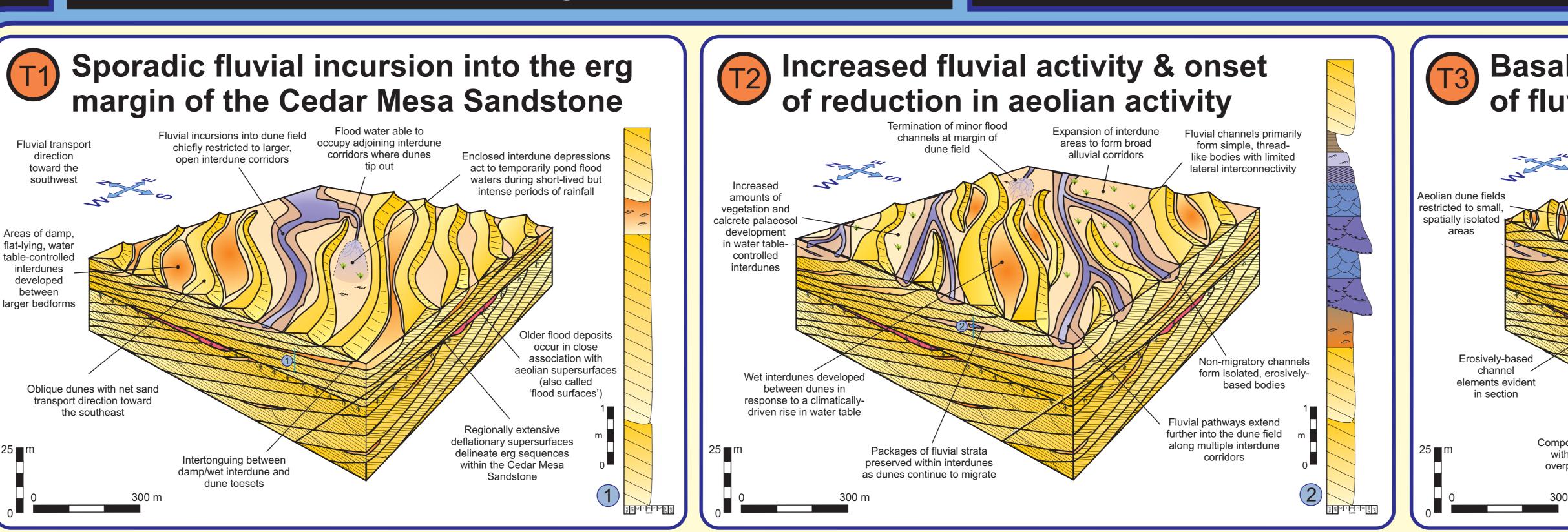
Facies Models: Lower Cutler Beds (Incised Valley Fill Units)

Fossiliferous limestone facies

Rising relative sea level; Indooding of fluvially out valley systems The uppermost 100 m of the Lower Cutler Beds is characterised by mixed accilian-fluvial units that are repeatedly interleaved with thin (1-5 m) but laterally extensive units of shallow marine origin, which record several episodes of marine transgression and regression across large parts of the Paradox basin. Within the Big Spring Canyon region, these marine units locally thicken to 10-15 m where they occupy erosively-based changed account of the procedure of the paradox basin. Within the Big Spring Canyon region, these marine units locally thicken to 10-15 m where they occupy erosively-based changed account of the paradox basin. Within the Big Spring Canyon region, these marine units locally thicken to 10-15 m where they occupy erosively-based changed accounted to represent the procedure of the paradox accounts and the paradox basin. Within the Big Spring Canyon region, these marine units locally thicken to 10-15 m where they occupy erosively-based changed to represent the procedure of the paradox account to the paradox accounts and th

prior ro river capture and the onset of incision in response

Facies Models: Cedar Mesa - Organ Rock Transition Zone



Basal Organ Rock Formation: onset of fluvial braidplain development Establishment of an extensive alluvial braidplain Abandoned channels and barforms on braidplain Abandoned channels and barforms on braidplain Termination of older aeolian dune succession in section Compound channel complexes with multi-storey, laterally overprinting channel bodies

Conclusions

The Permian Cutler Group, situated in the Paradox Basin of southeast Utah, records a variety of styles of interaction between aeolian dune deposits, fluvial channel and sheet deposits, and shallow marine transgressive shoreline and shelf deposits. These interactions reflect a range of both sudden and gradual transitions between competing environments and occur on a variety of spatial scales in three separate formations of the Pennsylvanian-Permian Cutler Group. The Lower Cutler Beds represents an arid coastal succession that experienced episodic marine transgressions, which led to the generation of a tripartite series of interactions between marine, aeolian and fluvial components of the depositional system. Shallow marine architectural elements are characterised by both calcarenite gritstone facies, arranged into erosively-based cosets, and by micritic limestone facies occur most commonly as complex cosets of strata, which form the fill of deeply incised channelised elements that cut down into underlying aeolian and fluvial units and which are interpreted as incised valley fill complexes. The overlying Cedar Mesa Sandstone records a basin-wide transition to a predominantly aeolian dune system, accumulation and preservation of which was controlled by a progressive but gradual rise in water table in marginal areas to form a wet aeolian system, and by an excess of sediment supply coupled with ongoing basin subsidence in more central parts of the basin to form a dry aeolian system. Evidence for fluvial incursion is widespread at the outer margin of the aeolian dune system but progressively diminishes with increasing distance into central parts of the palaeo-dune field. The overlying Organ Rock Formation comprises a bipartite succession of aeolian and fluvial strata which is interpreted to represent the preserved remnant of a fluvial terminal fluvial system. Within this system, most examples of fluvial and aeolian interaction demonstrate the contemporaneous nature of the two competing systems and the fluvial channel