The 490 m-thick Ross Sandstone Formation in western Ireland is a well-exposed and instructive deep-water system that has been extensively used as a subsurface analogue and training resource. The sea cliffs facing the Atlantic and along the Shannon estuary record the sandy deep-water part of a major shallowing-upwards Pennsylvanian succession that filled the Clare Basin. A recent behind-outcrop drilling program targeting the Ross Formation has focused on the Loop Head peninsula in west Clare. This has provided a fully-cored composite Ross section that underpins a new understanding of bed-scale variability and vertical system evolution. The work has now been broadened to include the key Ballybunion section on the south side of the Shannon which sits obliquely down-dip (to the east) of Loop Head (c.18 km away). Previous outcrop studies in Ballybunion have suggested that the character of the lowermost Ross with its abundant hybrid event beds (HEBs) may reflect a lateral fringe to the early Ross system and thus, the HEBs might be diagnostic of a fringe position.

A re-analysis of the basal Ross draws on three new borehole sections, one at Ballybunion and two on the Loop peninsula, all three coring the same Clare Shale to Ross Fm. transition. The cores can be tied using goniatite-bearing condensed sections and reveal a widespread precursor unit involving many stacked thin mudflow deposits (released from up-dip HEBs?) that can be traced through all three boreholes. These form the upper part of the Clare Shale and constitute an expanded first cycle of Ross deposition also comprising a pair of overlying sandier units, characterised by unusually outsized and coarse-grained HEBs. The sandstones show marked lateral facies changes from the Loop cores to Ballybunion that support a down-dip and axial position for the Ballybunion section rather than any link to a lateral slope.