

First Results from Behind-Outcrop Boreholes in Clare Basin Turbidites, Western Ireland

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The Carboniferous Ross and Gull Island turbidite systems in western Ireland provide useful outcrop analogues for producing oil and gas reservoirs in the North Sea, Gulf of Mexico and elsewhere. The high sea cliffs and intertidal rock platforms have been extensively used for training and reservoir characterization purposes. Previously the outcrops have been described using a variety of approaches including serial graphic logs, conventional photomosaics, helicopter fly-bys, LIDAR and photorealistic mapping, 2 and 3D GPR, seismic modeling and outcrop gamma logging. However, until recently, no core or wireline log data were available from immediately behind the cliffs to augment these datasets and to add to the training resource available in west Clare. A drilling program coordinated by UCD and funded by StatoilHydro successfully cored two demonstration boreholes in west Clare during March-May 2009. The boreholes targeted the upper Ross Formation at Ross, and the Ross to Gull Island transition near Cross - both sites much visited by field parties. Both were PQ boreholes (74 mm wide core), the Ross hole vertical (100.47 m long) and the Gull Island inclined (92.36 m of core). A full suite of wireline logs were also acquired, including a high-resolution Televier survey and spectral gamma logs (Ross hole only). The boreholes sample many of the key turbidite elements, including the Ross slump, several condensed sections, channel complexes, sheet sandstones, a variety of muddy slump and slide units and the transition from basin floor to slope settings. Preliminary work has focused on the bed-scale characterisation of the deposits, integrating the core and log data, orientating features in the cores using the Televier images and tying the cored sections to the cliffs and to each other along the coast east of Bridges of Ross. The west Clare cores have also been compared with new slim-hole cores in the Ross Formation from east Clare and Ballybunion in Kerry. Although extensively fractured and cleaved at outcrop and near surface, the slabbed cores provide an unprecedented high-fidelity view of the event beds making up the Ross Formation. Many sandstone beds have internal interfaces marking transitions between cleaner and more clay-rich sand with bed top mudclasts suggesting hybrid event beds are more important than outcrop observations would suggest. Cores in the slump deposits preserve a rich array of soft-sediment deformation features.