Optional GTW - Oamaru Field Trip

BASALTIC VOLCANISM ON A CARBONATE SHELF FACIES AND DIAGENESIS

Oamaru NEW ZEALAND

The local, one-day, optional workshop will be held on a picturesque coastal town where a mid-Cenozoic basaltic volcanic complex was emplaced within the margin of the Canterbury Basin. The field trip on the third day of the workshop will demonstrate how volcanism has affected geological structure and depositional and diagenetic facies in the vicinity.

The venue, Oamaru, is a coastal town within the Canterbury Basin where late Eocene-Miocene submarine volcanics are interleaved and overlapped with contemporaneous carbonate and fine grained clastic strata. The effects of the volcanism on the structural pattern and sedimentary facies distribution of this region are remarkable, providing excellent examples of rocks formed by the interaction of these distinctive environments. Intraplate volcanism around Oamaru starts in the late Eocene forming a cluster of surtseyan style volcanic cones composed of volcano-sedimentary sequence of tuffs and pillow basalts, as well as doleritic dikes and sills, and layers of coeval sediments. During the Oligocene-Miocene, Zealandia underwent a period of maximum inundation and the volcanic edifices defined a paleo-high setting for a productive cool-water carbonate factory. Following the cessation of volcanism, these relative highs became periodically subaerially exposed, developing multiple dissolution surfaces with karstic textures. The existence of an isolated and submerged paleohigh produced by the volcanic centres has had a significant effect on the geological evolution of that part of the basin, creating potential carbonate reservoirs where they might otherwise not occur. The field trip will visit local outcrops of basaltic pillow lavas, seamounts, and feeder dykes and sills into an Oligocene carbonate shelf. Features similar to those seen in outcrop can be observed in seismic sections and exploration wells offshore in the Late Cretaceous and Cenozoic Canterbury basin and so are representative of the effects of volcanism on the petroleum system. The pyroclastic deposits around the seamounts may function either as reservoirs or as seals and their emplacement clearly affected the distribution of carbonate reservoir facies around the seamounts on and around the volcanic platform. Local intrusions interact with carbonate minerals and seawater producing local to regional diagenetic changes possibly also affecting maturation. Delegates will be taken to outcrop localities that will show all of these features.

Field Trip Guide: Dr Kari Bassett

Kari is a senior lecturer at the University of Canterbury in Christchurch, New Zealand. Her expertise is sedimentology and basin analysis with particular interests in active plate boundaries and the interaction of volcaniclastic and sedimentary processes. She received her PhD from the University of Minnesota (1995), postdoctoral research at the University of California, Santa Barbara (1996-7) with Dr Cathy Busby, and has worked for many years in New Zealand and Antarctica (1998-now). Current areas of research include basin analysis and sequence stratigraphy in New Zealand's Late Cretaceous extensional and Cenozoic passive margin basins, quartz provenance analysis using SEM-cathodoluminescence, and paleoliquefaction in response to earthquake shaking.

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