SO226 CHRIMP – 3D seismic analysis of a large sea-floor depression on the Chatham Rise, New Zealand

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Vast areas of the Chatham Rise, east of New Zealand's South Island, are covered by circular to elliptical seafloor depressions. Distribution and size of these seafloor depressions appear to be linked to bathymetry: Small depressions several hundred meters in diameter are found in a depth range of ~500-800 m, while two types of larger depressions, 2-5 km and >10 km in diameter respectively, are present in water depths of 800-1100 m [Davy et al., 2010].

In Early 2013, a 3-D seismic reflection data-set was acquired aboard the R/V Sonne covering one of the 2-5 km depressions [Bialas et al., 2013]. The interpreted data set prominently features a subsurface conical feature and polygonal fault networks. We interpret that the seafloor bathymetry associated with the imaged depression is likely created by contour currents re-working sediment [Waghorn et al., in prep.]. The contourite features are underlain by the aforementioned polygonal fault networks and conical feature, which indicate upward fluid flow. The polygonal fault networks appear to nucleate in the stratigraphy containing the conical feature (Fig. 1). The seismic data set allowed us to interpret the conical feature as sediment remobilization. We also discovered a set of smaller buried depressions immediately beneath the contourite deposit. These buried depressions are directly connected to the stratigraphy containing the conical feature through the polygonal faults, which tend to truncate at the base of the buried depressions (Fig. 1). Therefore, the buried depressions are interpreted as paleo-pockmarks resulting from past fluid expulsion, presumably including gas. Based on stratigraphic interpretations and age correlation to a regio-

nal seismic line, the paleo-pockmarks could be as old as 5.5 Ma. We suggest that the paleo-topography resulting from these depressions provided the initial roughness required to form mounded contourite deposits [Faugeres et al., 1999], leading to the current day depression features noted in seafloor bathymetry [Waghorn et al., in prep.].

References

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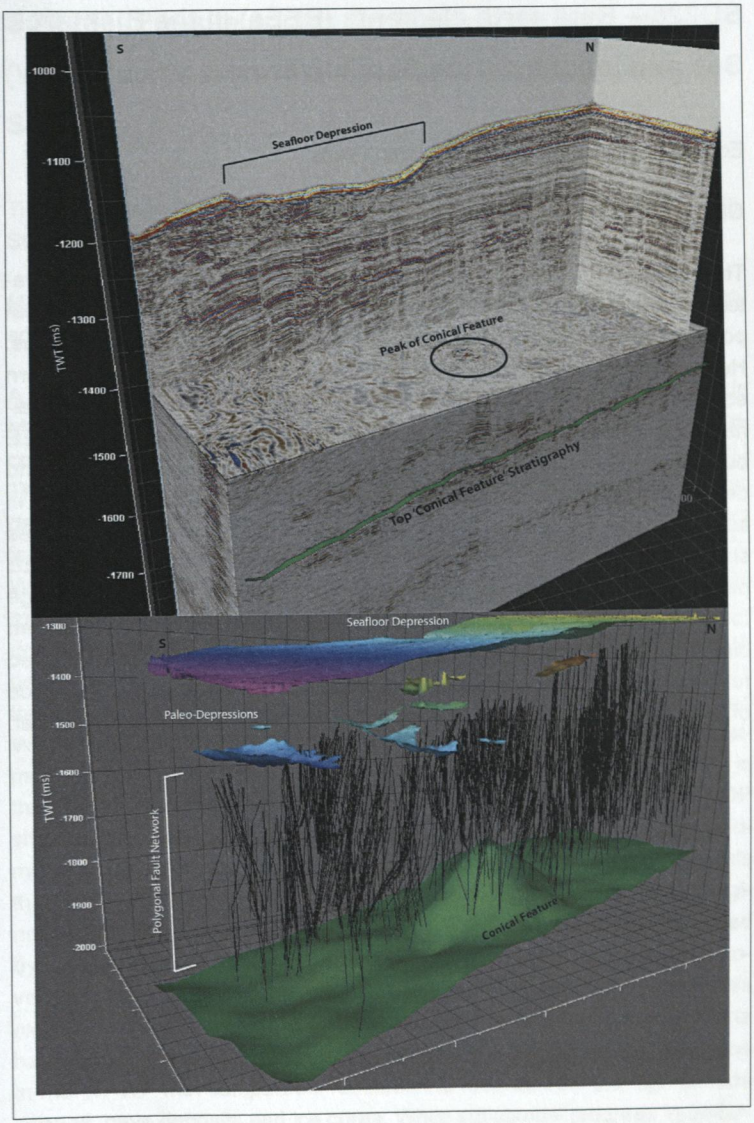

Figure 1. Top: Showing the 3-D Seismic data collected aboard the R/V Sonne. Features of interest include the conical feature in the subsurface and seafloor depression. Bottom: During interpretation, a polygonal fault network and small buried depressions were discovered. The buried depressions, interpreted as paleo-depressions, are connected to the conical feature through the polygonal fault network. From [Waghorn, 2014].