

Stratigraphy and Structure Map (1:50000) of Allochthonous Sedimentary Strata North of the Bay of Islands, western Newfoundland.

Cambro-Ordovician strata, of the ancient margin of Laurentia in western Newfoundland, show considerable promise as hydrocarbon targets. Over the last 15 years, drilling has successfully demonstrated that an active petroleum system exists, but with only a small number of deep wells in this area, we still lack a clear understanding of the stratigraphy, structural evolution, and the nature of the structures which trap and preserve hydrocarbons.

Questions remain regarding (1) the disposition of various shaly intervals as potential source rocks (Sinclair, 1990); (2) the complex burial and diagenetic history (Williams et al., 1998), and; (3) whether the architecture and distribution of other clastic strata from both the autochthon and allochthon are potential reservoir units (e.g. Hawke Bay and Blow Me Down sandstones; Cooper et al., 2001; Burden et al., 2005). With clear answers to these questions, a diverse portfolio of exploration strategies may be developed.

One of the ways PEEP can contribute to economic development of the region is to see that appropriate maps of the allochthonous strata underlying the Bay of Islands Ophiolite Complex are available. These maps are built from careful geologic analyses determining age and sedimentary environments for strata, separating “look-alike” units, and constructing a structural geology map. A lack of data in this area has to this point compromised petroleum systems modelling. Before progress can be made in onshore exploration, these problems must be addressed by targeted mapping of sedimentary strata.

### **Project Description**

In keeping with the aims of PEEP and specifically to achieve a better understanding of the evolution and destruction of the Laurentia margin, this proposal aims to resolve the stratigraphy and structure of the allochthon north of the Bay of Islands area. To accomplish this task, 1:50000 mapping will be focussed upon the area lying immediately north of the map produced by Burden et al. (2006). The southern end of this region is approximately defined by the south shore of the Bay of Islands. Mapping will be completed on Woods Island, Eagle Island, the adjacent shoreline at Middle Arm Point and North Arm Point and north, with approval of Parks Canada, to the shore of Bonne Bay. Sedimentary strata and regions currently recognized as “melange” and resting upon and beneath the ophiolite will be examined in detail. These rocks provide clear indications to the rift-drift origins for this region. In total, and over the course of two field seasons, 2010 and 2011, about 300 km<sup>2</sup> of sedimentary rock, unevenly distributed as wide presumably fault bounded bands beneath ophiolites and volcanics will be traversed by foot, 4WD vehicle, motorboat, and helicopter, and mapped.