

Holocene paleoproductivity in the Northwestern Pacific determined by foraminiferal assemblages in some fjords of Vancouver Island, British Columbia

T.M. Schell

Centre for Marine Geology, Department of Earth Sciences, Dalhousie University, Halifax, Nova Scotia B3J 3J5, Canada

Foraminiferal assemblages may be used as proxies for paleoclimatic and paleoceanographic conditions such as temperature, oxygen, salinity, and organic material production. Various combinations of those factors may indicate periods of enhanced and suppressed upwelling events, and associated productivity. Once the paleoceanography of a region is understood, the suitability of a paleohabitat for a particular pelagic fish species may be inferred. Little reliable

research exists on the paleoproductivity of commercially and ecologically important Pacific pelagic fish such as salmon and herring.

Vancouver Island is located in the bifurcation region of the Subarctic Current and the West Wind Drift. The North-South shifting of this point determines whether the regional ocean climate will be dominated by the warm California Current or the cold Alaskan Current. Effingham Inlet (the first

study site selected) is a narrow 15 km-long double silled fjord, situated on the western side of Vancouver Island, British Columbia. It is located near the region of the northern extreme of the California Current. Several commercial and ecologically important species of pelagic fish, such as Pacific salmon and sardines are dependent on the extent of the California Current for a favourable habitat. Recent accounts of fishing history suggests a large scale expansion and contraction of this favourable habitat due to the large-scale changes in oceanic climate, *i.e.*, upwelling and El Nino.

The restricted nature of Effingham Inlet is an ideal primary study site with its deep basins and shallow sills, which provide excellent sedimentological and paleobiological records because of high sedimentation rates of low-oxygen bottom sediments that allow high resolution records and excellent preservation of fossils. Fjords are useful in paleoceanographic research because in many cases only the

strong upwelling and ocean-climate events are felt in their inner basins, thus removing most of the "background" productivity. The correlation between paleoceanographic conditions inferred from foraminiferal evidence and changes in fish stocks is a particularly powerful analytical tool. This approach employs well-used micropaleontological concepts and applies them to environmental geology, oceanography and fisheries management problems.

A study of living and Recent foraminifera, both benthic and pelagic, thecamoebians and Sr-isotopes of fish bone material has been started to reconstruct the paleoceanographic conditions. Preliminary results suggest strong signals throughout one core sequence with cycles of the low oxygen indicator, *Fursenkoinia fusiformes*, showing several peaks that correspond to high productivity. In addition, this research will enhance the minor work done to date on recent to Late Quaternary Northwestern Pacific coastal foraminiferal faunas.