Radiolarian faunal turnover at the T/J boundary: Western Canada and Japan

Carter, E.S., Department of Geology, Portland State University, Portland, Oregon 97207-0751 USA, escarter@coinet.com, Hori, R.S., Department of Earth Sciences, Ehime University, Matsuyama 790-8577, Japan, shori@sci.ehime-u.ac.jp

Precise comparison of faunas from Queen Charlotte Islands, British Columbia and the Inuyama area of southwest Japan indicates that major changes occurred in radiolarians across the Triassic/Jurassic (T/J) boundary. Nearly twenty genera and over 130 Rhaetian species disappeared at the end of the Triassic causing an almost total faunal turnover. Hettangian radiolarians immediately above the boundary are low in diversity, composed mostly of small, primitive-type spumellarians with spongy or irregularly latticed meshwork and rod-like spines.

Thick clastic sequences (>130m) of Rhaetian-Hettangian age in Queen Charlotte Islands are indicative of an outer shelf to upper slope setting, whereas in Inuyama, condensed chert sequence (<4m) of equivalent age are representative of deep-sea sediments deposited below CCD depth. Irrespective of differing sedimentation rates and sedimentary environments radiolarians show a similar turnover pattern highlighting their potential as indicators of the T/J boundary.

Detailed correlation indicates that *Livarella validus*, *Pentaspongodiscus? dihexacanthus*, *Globolaxtorum tozeri*, *Citriduma* sp. C (in Carter 1993), *Deflandrecyrtium aff. ithacanthum*, Hagiastrid? gen. et sp. indet A, plus all species of *Betraccium* and *Risella* disappear in topmost Rhaetian beds in both Queen Charlotte Islands and Inuyama. In Japan, just above this level (<10cm) *Pantanellium tanuense*, *Palaeosaturnalis tetraradiatus*, *Archaeocenosphaera laseekensis*, Spumellaria indet A (in Carter et al. (1998), primitive forms of Jurassic-type *Bipedis*, and abundant spherical spumellarians first appear and are representative of the lowest Hettangian. In Queen Charlotte Islands the first Hettangian species appear 1-2m above the final occurrence of Rhaetian faunas.

Further evidence of the turnover is provided by a new excellently preserved sample from Queen Charlotte Islands that contains abundant (~93%) lowest Hettangian radiolarians and rare (~7%) Rhaetian species (survivors). This sample was probably positioned very close to the boundary and co-occurs with an ammonite attributed to the lowermost Hettangian. Sample composition supports Japanese data that a few Rhaetian species survived into the lowest beds of the Hettangian but disappeared soon afterwards (e.g. *Livarella* and *Deflandrecyrtium*).

Radiolarian abundance in the Rhaetian and Hettangian indicates that primary productivity was high during most this time except during the turnover. Highly abundant primitive spherical forms (and floods of *Archaeocenosphaera*) in the lowest Hettangian may be related to reduced productivity in the open ocean and/or of opportunistic forms filling open niches. The radiolarian data further suggests that the cause of the extinction was severe but relatively short-lived allowing new genera and species to recover quickly.