

Biochronology and paleontology of uppermost Triassic (Rhaetian) radiolarians, Queen Charlotte Islands, British Columbia, Canada

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A rich radiolarian fauna of Rhaetian age has been recovered from limestone concretions in strata of the Sandilands Formation at localities on northwest Graham Island (Kennecott Point), Louise Island, Skidegate Inlet, and Kunga Island, Queen Charlotte Islands, British Columbia. Unusually thick stratigraphic sections at Kennecott Point and Kunga Island record continuous sedimentation through latest Triassic and earliest Jurassic time. Independent dating is provided by conodonts that co-occur in many radiolarian samples and rare ammonoids that are associated at several levels.

New radiolarian zonation for the Rhaetian defined by Unitary Associations (U.A.; Guex 1977, 1991) is presented. A database recording the appearance of 136 species in 69 superposed horizons or samples of 6 sections was used to establish 27 successive U.A., with each U.A. defined by the totality of its characteristic species. U.A. were grouped into 6 distinct assemblages (biochronozones) whose terminology follows Carter 1990.

The late Norian *Betracium deweveri* Zone (Blome 1984) ranges into post-Monotis basal strata of the Sandilands Formation (late Norian or earliest Rhaetian). Immediately above this zone, three successive radiolarian assemblages occur whose age is correlated with Late Triassic ammonoid biochronology of Toær (1979). Assemblage 1, the lower one, approximates the lower part of the Amoenum Zone; Assemblage 2 (with four subassemblages) approximates the middle and upper Amoenum Zone; and Assemblage 3 is correlated with the uppermost Triassic Crickmayi Zone.

Two formal zones are established which allow worldwide correlation of the Rhaetian using radiolarians. Their ages are correlative with the Late Triassic ammonoid biochronology of Tozer (1979). The *Proparvicingula moniliformis* Zone contains radiolarians of Assemblage 1 and Assemblage 2 (this study); it represents the lower Rhaetian and is approximately equivalent to the Amoenum Zone. The *Globolaxtorum tozeri* Zone contains radiolarians of Assemblage 3 (this study); it represents the upper Rhaetian and is equivalent to the Crickmayi Zone.

All radiolarian species used in the zonation are discussed along with a few others having more limited occurrence. Species previously described and/or figured in the literature are discussed in terms of their occurrence in Queen Charlotte Islands. One family, five genera and 63 species are described as new.