

## The Deglaciation of New England and its Relation to Climate: The Fusion of Varves, Radiocarbon Ages, Paleomagnetism, Cosmogenic-Nuclide Exposure Dating, and Critters in Lakes

In order to better understand the relationship of past glacier response to climate change on scales down to decades it is necessary to develop resolution terrestrial records of deglaciation. A reformulation and calibration of Ernst Antevs' New England Varve Chronology, first published in 1922, takes advantage of large, long-lived glacial lakes in the northeastern U.S. and has allowed this to happen. The new chronology is renamed the North American Varve Chronology (NAVC) and ties together Antevs' main varve sequences and calibrates it using radiocarbon ages.

Using the varve records a very precise deglaciation record has been formulated in New England from which rates of deglaciation have been calculated. Varve records have the added advantage of carrying a climate signal since glacial varve thickness variations are dominated by variations in glacial meltwater production (i.e. glacier ablation rates) making it possible to identify warming and cooling events that: 1) coincide with changes in ice recession rates and readvances, and 2) can be precisely matched to cooling and warming events in Greenland ice cores down to the scale of decades in the period of 18,300 - 12,500 yr before present.

Extension of the deglaciation history to eastern Maine, as far west as central New York, and further back in time to the Late Glacial Maximum has been possible through paleomagnetic correlations and re-calibrated  $^{10}\text{Be}$  cosmogenic-nuclide exposure ages. The new time scale and study of varves in New England has also been used to place constraints on the re-habitation of New England water bodies by various types of lacustrine fauna through trace fossil studies of such organisms as worms, insect larvae, crustaceans, and fish.