During the late Miocene epoch, about seven million years ago, large areas of the continents experienced drying, enhanced seasonality, and a restructuring of terrestrial plant and animal communities. These changes are seen throughout the subtropics, but have typically been attributed to regional tectonic forcing. Here we present a set of globally distributed sea surface temperature records spanning the past 12 million years based on the alkenone unsaturation method. We find that a sustained late Miocene cooling occurred synchronously in both hemispheres, and culminated with ocean temperatures dipping to near-modern values between about 7 and 5.4 million years ago. The period of maximum cooling coincides with evidence for transient glaciations in the Northern Hemisphere and with a steepening of the pole to equator temperature gradient, as well. We thus infer that late Miocene aridity and terrestrial ecosystem changes occurred in a global context of increasing meridional temperature gradients. We conclude that a global forcing mechanism, such as the previously hypothesized decline in atmospheric CO2 levels between eight and six million years ago, is required to explain the Late Miocene changes in temperature, climate and ecosystems.

Host: David Lund
Time & Date: 11:00 am, Friday, September 30, 2016
Place: Marine Sciences Building, Seminar Room 103