30^{th} IUGG Conference on Mathematical Geophysics,
Merida, Yucatan, Mexico, June 2014
Abstract Submission

Title: A Multiple Record Analysis of the Mid-Pleistocene Transition using Empirical Mode Decomposition

Authors: Charles D. Camp, Tanner J. Gibson
Affiliation: California Polytechnic State University

Session: Nonlinear phenomena in the climate system
Preference: Oral presentation

Abstract: Analyses of ocean sediment records are a primary tool for the study of the glacial cycles of the Pleistocene and the transition in character of those cycles between the early and late Pleistocene. Recently, two such records, containing proxies for global temperature and ice volume, have been constructed with independent agemodels devoid of orbital assumptions. We analyze these records using a relatively new time series analysis technique – Empirical Mode Decomposition (EMD). EMD is a local, nonlinear, data-adaptive technique; as such, it is well suited for the study of nonlinear and nonstationary data. Our analyses of both records clearly identify the emergence of new 100-kyr glacial cycles at approximately 1.25 Myr ago. They also isolate 40-kyr cycles which persist throughout the entire Pleistocene. A comparison of the two analyses also reveals discrepancies which could potentially identify weaknesses in the agemodels used to construct the data records.