Sensitivity study of the role of vegetation in Miocene climate change

John Y. You[1], Dietmar Muller[1], Matthew Huber[2], Bette Otto-Bliesner[3], Chris Poulsen[4], Maria Sdrolias[1] and Joachim Ribbe[5]

[1]University of Sydney Institute of Marine Science (USIMS), Building H11, University of Sydney, NSW 2006, Australia
[2]Earth and Atmospheric Sciences, Purdue University, West Lafayette, Indiana, USA
[3]Climate Change Research, National Center for Atmospheric Research, Boulder, Colorado, USA
[4]Department of Geological Sciences, University of Michigan, 425 East university Avenue, Ann Arbor, MI 48109-1063, USA
[5]Department of Biological and Physical Sciences, University of Southern Queensland, Toowoomba, Queensland 4350, Australia

Abstract
The Miocene Climate Optimum (MCO) at 15 ma is a geologically recent warming event with a temperature of 3º-5ºC higher than today but with atmospheric CO_2 only about half its present value. Study of the MCO has implications for present day climate research to elucidate factors other than CO_2 which may contribute to current global warming. Here we attempt to study the role of vegetation which can potentially contribute about 2ºC warming to the MCO. We develop a novel methodology to merge oceanic palaeo-bathymetry grids with continental palaeo-topography grids to produce Miocene boundary condition for palaeoclimate modelling and apply updated NCAR coupled climate models, CCSM3 and CAM3.1. In this presentation, we show recent results of our model simulations inferred from modern conditions and proxies.