Carleton UNIVERSITY | Department of Geography & Environmental Studies

FOUNDERS SEMINAR

Presents:

Dr. Hugo Beltrami

Climate Change and Continental Heat Storage

When: **Friday November 25, 2016**
Time: **2:30- 4:00**
Location: **Loeb A220**
(Light refreshments will be available)
ALL WELCOME

Abstract:
The ocean heat storage component of the Earth's energy budget for the second half of the 20th century was about $14 \pm 2\times10^{22}$ J, while the continental subsurface stored $8 \pm 1\times10^{21}$ J during the same period. Although the magnitude of the continental heat storage is smaller than the uncertainty range of the estimated ocean heat storage component, the heat storage in the continental subsurface is important for determining the distribution of the Earth's energy budget and the magnitude of the Earth's energy imbalance. Additionally, several Earth system processes with potentially important climate feedback mechanisms take place within the shallow subsurface such as enhanced soils respiration and permafrost dynamics. The stability and evolution of these processes are dependent on the long-term thermal state of the ground and require robust estimates of continental energy fluxes for proper long-term modeling of their evolution in a future climate. We assessed the ability of 32 General Circulation Models (GCMs) from the fifth phase of the Coupled Model Intercomparison Project (CMIP5) to simulate the magnitude of heat storage in the continental subsurface. Our analysis demonstrates the importance of the bottom boundary depth in the context of continental energy storage in GCM's simulations and further provides a framework for understanding possible sources of variability in the simulation of subsurface energy content.

Bio:
Dr. Hugo Beltrami is a Professor and Canada Research Chair in Climate Dynamics at St. Francis Xavier University in Nova Scotia. He holds a bachelor's degree in Physics from the University of Winnipeg, a MSc in Theoretical Astrophysics from Queen's University in Kingston, and a PhD in Environmental Sciences from the Université du Québec à Montréal. He was a Post-Doctoral Fellow at the Department of Geology and Geophysics, University of Utah, the Department of Earth and Planetary Sciences and the Centre for Climate and Global Change Research at McGill University. Dr. Hugo Beltrami research is focused on fundamental scientific challenges related to the overall characterization of the energy exchange between the atmosphere and the shallow part of the Earth's continental crust, an interface extremely important for life on our planet. Dr. Beltrami leads an interdisciplinary team with a range of expertise in areas such as paleoclimate, soil biogeochemical processes, and public health planning in the future climate.

Web site: http://climate.stfx.ca/Hugo/Home.html.

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