



Interdisciplinary Data Sciences



* IDSC Seminar Series *
February 17, 2017 2:00p.m.-3:00pm
Location: CPR 118

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Presents

Dr. Charles Connor

School of Geosciences
University of South Florida

Title: Statistical Modeling of Volcanic Eruptions

Abstract: Volcanic eruptions are fantastic and dangerous. Volcanoes exhibit a bewildering array of behaviors, from pulsatory eruptions of generally small size to eruptions with continental scale impacts. Eruption rates and magnitudes have high aleatoric uncertainty and our models to describe volcanoes have high epistemic uncertainty. In short volcanology is ripe for statistical analysis. Volcanic processes are described statistically using a series of examples, including forecasting long-term patterns of eruptions on Mars and from Icelandic volcanoes affecting northern Europe. Our estimates of the magnitudes of volcanic eruptions in the past can be assessed using a new modeling approach developed at USF - an efficient and effective inversion and uncertainty quantification approach for estimating eruption parameters given a data set collected from a tephra (volcanic ash) deposit. The approach is model independent and here is applied using Tephra2, a code that simulates advective and dispersive tephra transport and deposition. The Levenburg-Marquardt algorithm is combined with formal Tikhonov and subspace regularization to invert eruption parameters; a linear equation for conditional uncertainty propagation is used to estimate posterior parameter uncertainty. Both the inversion and uncertainty analysis support simultaneous analysis of the full eruption and wind field parameterization. The combined inversion/uncertainty quantification approach is applied to the 1992 eruption of Cerro Negro (Nicaragua) and the 2011 Kirishima-Shinmoedake eruption (Japan).



Biography: Chuck Connor is a Professor of Volcanology and Geophysics at the University of South Florida. His research focuses on the assessment of volcanic hazards, including forecasting rates and magnitudes of volcanic activity and probabilistic assessment of volcanic hazards. He has developed numerical models to simulate volcanic processes such as tephra (volcanic ash) fallout and lava flow. In 2016 he was appointed a member of a U. S. National Academy of Sciences panel to evaluate the state of volcano science in the U. S. He has served as Chair of the Department of Geology and as Associate Dean of Research for the College of Arts and Sciences at USF.

IDSC Contact:
Dr. K. Ramachandran
University of South Florida
4202 E Fowler Ave, CMC317
Tampa, FL 33620-5700
E-mail: ram@usf.edu
Telephone: (813)-974-1270
Fax: (813)-974-2700
<http://idsbigdata.com/>