

School of Earth and Environmental Sciences Colloquium Series

Dr. Ryan O'Loughlin

Assistant Professor, Philosophy Department,
Queens College

A Philosophical Take on Error and
Lower-Skill Models in Climate Science

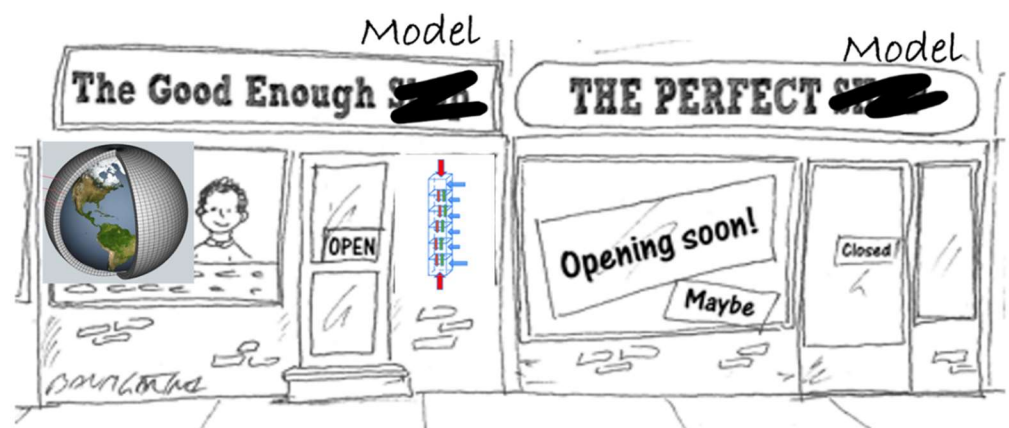
Wednesday, Sept. 27th

12:15-1:30 PM,
Science Bldg. C-207

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Not all climate models are equally good. But are lower-skill models bad? How can we make use of these low-skill models? And what have we learned from the error in modeling? In this talk, I discuss the value of error and lower-skill models in science. My thesis is that lower-skill models are scientifically valuable because by probing them, scientists can learn knowledge of climate change that otherwise would not have been possible. Their value is underappreciated. I focus on the climate model intercomparison projects, where multiple models are compared and evaluated. First, I analyze the strategies to diagnose climate model errors, which demonstrate scientists' understanding of their models. Error diagnosis strategies include physical reasoning and hypothesis testing. I propose an "error repertoire" that could enable a broader understanding of state-of-the-art climate models. Then, I turn to lower-skill (i.e., numerically less accurate) models. These models help produce knowledge in ways that have been underappreciated. More specifically, low-skill models constrain the estimates of climate variables, provide data to test model weighting schemes, and serve as evidence to help resolve model-data discrepancies. A key takeaway message is that apparent failures in climate modeling are opportunities to produce more knowledge and wiser decision-making.