

1077-AE-1828

Kerry A Emanuel*, Rm 54-1814, MIT, 77 Massachusetts Avenue, Cambridge, MA 023139. *A Model Hierarchy for Undergraduate Education in Radiative and Convective Heat Transfer.*

Much of today's undergraduate climate education relies on highly qualitative expositions of climate physics, in addition to discussions related to earth's climate history. Part of the problem is that a deep understanding of climate physics relies on knowledge of quantum physics, which many undergraduates lack, while at the same time, the equations governing radiative transfer do not usually admit simple solutions, and because radiative transfer is non-local, solutions are often non-intuitive. How do we bridge the yawning gap between hand-waiving descriptions on the one hand, and full-up radiative and convective transfer calculations on the other? In this talk, I will present a model hierarchical approach that begins with simple one- and two-layer models that admit analytic solutions and progresses upward through simplified multi-layer models that have limited parameter sets and, finally, highly detailed single-column models with accurate solutions of the equations of radiative and convective heat transfer. The virtues and possible drawbacks of this approach will be discussed. (Received September 21, 2011)