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Data Assimilation for Model Development

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In this talk I will describe the specific uses of data assimilation for model development. Although the paradigm for data assimilation in terrestrial models is numerical weather prediction, there are important differences. We are not nearly as confident in the underlying dynamical models of the terrestrial biosphere as for models of atmospheric flow. Thus the assimilation includes both refinement of model parameters and guidance of model trajectories. Perhaps more importantly the use of multiple data streams has, until now, always highlighted flaws in model structure as well as bad parameter values. Note that this would not be apparent without performing the assimilation. This suggests that the analysis of the optimal performance of an assimilation system, already important in conventional problems like NWP, is the principal task of terrestrial data assimilation. I will demonstrate this with some simple case studies and suggest some strategies to attack the problem.