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Marine Boundary Layers: OBSERVATIONS and Models

In this talk I will discuss the role of observations and models in studying atmospheric boundary processes. Observations play a crosscutting role in the context advancing the science of weather and climate. At a fundamental level, it is observations that can be used to develop a basic understanding of physical processes that must be modeled within the land-ocean-atmosphere system. Observations are needed for initialization, assimilation, and verification of models and play a key role in improving parameterizations. In-situ observations are required to improve various aspects of satellite retrievals. Global cloud resolving models might cause the convective parameterization problem to, within a few years, evaporate in a puff of numerical smoke. But, with their predominance of small-scale processes, oceanic and atmospheric boundary layers (BLs) will likely remain a modeling battleground for decades. The future of BL observations is intimately tied up in the important science problems that can be practically addressed with existing observing technologies. But the priorities must also be considered in the context of the balance with numerical simulations – it makes no sense to field a new megadollar field program if the answers can be obtained with a carefully designed large eddy simulation (LES).