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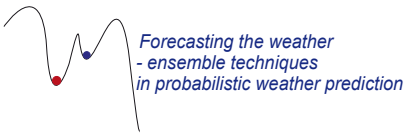

Comparison of different mixing length formulations in a simplified model that allows the interaction between surface and atmosphere

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Under very stable conditions, numerical models usually tend to underestimate the turbulent fluxes in the nocturnal boundary layer.
The parametrization of the turbulent exchange coefficients varies widely depending of the surface scheme adopted. Generally, first-order models make the use of a stability function that directly and arbitrarily relates the turbulent mixing to the Richardson number. Such choice tends to reduce the eddy diffusivities, preventing them to reach large values. On the other hand, in TKE models that solve a prognostic equation for the turbulent mixing, this problem is attacked through mixing length parameterizations. Although a number of studies have suggested that TKE models lead to better results than a first-order scheme under stable conditions, in general neither type of turbulent closure are able to reproduce turbulent bursts, a common occurrence in the stable boundary layer.
In a previous work, we have shown that intermittent burst are reproduced by a simple model that incorporates a TKE equation with turbulent vertical diffusion and with the ground temperature being controlled by the surface energy budget. Now, those results are extended, by the introduction of different mixing length formulations on the scheme. The aim is to validate such simplified scheme for use in single-column models that represent the interaction between the surface and the atmosphere in the nocturnal boundary layer.