IMPROVING MIXING LENGTH-SCALE FOR INCLINED STABLE BOUNDARY LAYERS

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Abstract: We consider to improve the "z-less" mixing length-scale for parameterization of turbulent processes in stable atmospheric boundary layers (SABL) over sloped surfaces. Since SABL structures are far from being understood properly today, their parameterizations or explicit treatment are still usually very sketchy in most mesoscale and climate models as well as in related transport and dispersion models. Typically an over-diffusion through the SABL occurs in most of numerical models. With the "z-less" mixing length-scale proposed here the over-diffusion is absent. Moreover, the mesoscale model used, MIUU model, gave results similar to those from an improved Prandtl model, i.e. katabatic flow occupying the lower and more active part of the SABL developed in both models. The corresponding low-level jet occurring in the strong near-surface inversion appears similar in both models. Certain details vary simply because of very different nature of the models deployed. The results could be used in different types of numerical modeling, parameterizations of the SABL, air-pollution transport and dispersion and further development of analytical models and data interpretation.