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On the bulk Richardson number parameterization method with taking into account the long lived PBL regimes

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Practically orientated schemes based on the bulk Richardson number are developed. In this schemes are incorporated not only traditional stratification–roughness factors, but and new non-local factors caused by the free-flow stability at neutral and stable long-lived PBL in the high latitudes. The latter effects lead to proposed by Zilitinkevich corrections in the profiles of the meteo elements described by Monin-Obukhov similarity theory.

Using that it is realized flux-calculation techniques. It is shown that the non-local effects lead to significant increase of the critical bulk Richardson number (for example 0,6) in comparison with the traditional values (0,2–0,25). It is explored the dependence of the surface fluxes on the non-local effects at different PBL regimes and it is established their significance.

The approaches can be used as a practical tool in the environmental and weather/climatic modeling applications.