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On current and future research of bora wind

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Bora is a gusty wind blowing at the eastern Adriatic coast from the NE quadrant with sustained speeds between 5-20 ms^{-1}, its gusts surpassing 50-70 ms^{-1} (corresponding to downslope windstorms with hurricane speeds) in the lee of the mountains. Similar bora-like flows appear elsewhere in mountainous areas where flow transcriticality (regarding "vertical" Froude number, or its inverse, dimensionless mountain height) is the dominant flow property. On the finer mesoscale, the bora jet and wake pattern relates to the mountain pass and top distribution.

Significant current and future efforts in studying bora gradually moves toward progressively smaller spatio-temporal scales, i.e., toward micrometeorology and bora turbulence. One feature of bora turbulence is its anisotropy, i.e., the velocity component variance aspect ratio. The enhanced bora anisotropy might explain barely adequate experimental, otherwise fine dimensional scaling between bora turbulent kinetic energy, its dissipation and integral length-scale. Next, due to increased application needs, wind-energy and engineering (in addition to air-pollution and health) communities demand simple and robust wind speed estimates for the bora surface layer. We deploy Prandtl scaling for two-level bora wind speed and the corresponding heights, $u_1/u_2 = (z_1/z_2)^{\alpha}$, where typically $0.15 \le \alpha \le 0.4$; appropriate averaging time is essential for obtaining suitable α value(s). Finally, we introduce a generalized mixing length-scale for all nonnegative gradient Richardson number values in WRF mesoscale model so as to simulate various types of bora flows more faithfully.