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Geophysical fluid dynamics beyond the Traditional Approximation

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In studies on Geophysical Fluid Dynamics, it is common practice to take the Coriolis force only partially into account, by neglecting the components proportional to the cosine of latitude – the so-called Traditional Approximation (TA). In this talk an overview is given of the consequences of abandoning the TA, based on evidence from numerical and theoretical studies, and laboratory and field experiments. The phenomena most affected by the TA include meso-scale flows (Ekman spirals, deep convection, equatorial jets) and internal waves. Abandoning the TA produces a tilt in convective plumes, a dependence on wind direction in Ekman spirals, and gives rise to a plethora of changes in internal-wave behavior in weakly stratified layers, such as the existence of trapped short low-frequency waves, and a poleward extension of their habitat. (Ref.: T. Gerkema, J.T.F. Zimmerman, L.R.M. Maas & H. van Haren, "Geophysical and Astrophysical Fluid Dynamics beyond the Traditional Approximation", *Rev. Geophys.*, 2008, in press).