



## **Estimating Atmospheric Stability Based Solely on Surface-Layer Wind Speed Profile**

Sukanta Basu

Delft University of Technology, Geoscience and Remote Sensing, Faculty of Civil Engineering and Geosciences, Delft, Netherlands (s.basu@tudelft.nl)

The wind energy community is gradually recognizing the significance of atmospheric stability in both power production and structural loading. However, the estimation of stability requires temperature gradient data which are not commonly measured by the wind farm developers or operators. To circumvent this problem, we propose a simple approach to estimate stability (and associated turbulent fluxes) from only wind speed measurements. Our approach is deeply rooted in the so-called Monin-Obukhov similarity theory. For offshore environments, this approach also yields reliable estimates of aerodynamic surface roughness. The proposed approach is ideally suited for sodar and lidar-based wind measurements owing to their high vertical resolution in the surface layer.