Wind Profiles and Change of Terrain Roughness at Risø

The Risø 125 m tower is situated on a narrow peninsula, surrounded by bays of varying width. The resulting surface roughness changes are clearly reflected by ‘kinks’ in the measured wind profiles, whose characteristics depend on the wind direction. The height of the lowest kink for water-to-land trajectories is in good agreement with theory. The roughness lengths computed for the immediate surrounding of the tower vary with wind direction in a manner consistent with terrain features. However, the roughness lengths of the water estimated from the profiles are unrealistically small. The mean profiles obtained when the trajectory passes over relatively homogeneous terrain are represented quite well by wind profile expressions that are usually applied only in the surface layer.