

Vertical Eddy Diffusivity in Relatively Stable Condition Derived from a 205 MHz Stratosphere-Troposphere Wind Profiler Radar

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A state-of-the-art stratosphere-troposphere wind profiling radar operating at 205 MHz installed at the Cochin University of Science and Technology, Cochin (10.04N; 76.33E), India is operated in relatively stable winter period to derive the vertical eddy dissipation rate over this tropical coastal urban station. This active phased array VHF radar provides high temporal (a few seconds to a few minutes) and vertical (45 m) resolution data from 315 m to beyond 20 km heights. After correcting for the beam broadening and shear broadening effects, it is seen that the derived value of turbulent eddy diffusivity (K) is high in the lower troposphere including the planetary boundary layer. The observed values of K vary between $0.1 - 1 \text{ m}^2\text{s}^{-1}$. The higher values of K are generally attributed to the topographical features and also to the contrasting air mass originating from the coast and land region. Detailed results with implications are discussed.