

## **Determination of the Surface Roughness Parameter and Wind Shear Exponent of Kisii Region from the On-Site Measurement of Wind Profiles**

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### **Abstract**

The research sought to investigate the surface roughness parameter ( $\alpha$ ) and wind shear exponent ( $z_0$ ) of the Kisii region (elevation 1710m above sea level, 0.68°S, 34.79°E). A two month experiment was carried out at three sites of Kisii region wheretwo PRO AcuRite 01036 Wireless Weather Stations with pro+ 5-in-1 Sensors were set at different hub heights above the ground and data sent and received by a display board set at a room through remote sensing at an interval of 12 minutes. Data was collected from the display board through the pc connect software, grouped into discrete data and then calculated to represent; mean wind speed, diurnal variation, daily variation and monthly variations. The calculated averages of wind speeds at hub heights of 10m and 13m were then used to determine the wind shear exponent and roughness parameter of the sites. The wind shear exponents were found to be 0.92, 0.41 and 0.52 for Nyamecheo, Kisii University and Ikobe stations respectively. The roughness parameter was also calculated and found to be 3.75m, 0.98m and 1.68m for Nyamecheo, Kisii University and Ikobe respectively with an average of 2.153m.

**Key words:** *Surface roughness parameter, wind shear exponent, Wind speed*