High altitude wind resource in the Middle East

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This study presents a first identification of areas favorable to Airborne Wind Energy (AWE) Systems deployment in the Middle East and illustrates their diurnal and seasonal characteristics. Optimal heights of AWE system deployment are computed. The AWE literature has conventionally used a top-down approach where AWE potentials are estimated as a fraction of wind power density. This study takes the bottom-up approach where the regional AWE potentials are estimated using realistic machine specification with assumptions upon deployment conditions. The annual energy production per capita illustrates the potential of AWE systems in fulfilling electricity needs at the current level for several countries in the region. Our estimate also compares favorably to the near-surface wind power potential using identical data source from a previous study. In addition, the non-monotonicity in the vertical profile is examined for areas with potential LLJ influences, where behaviors in wind speed and direction similar to that of inertial oscillations are identified.