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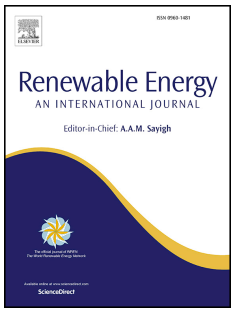

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Evaluation of Planetary Boundary Layer Simulations for Wind Resource Study in East of Iran

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Abstract

The usual way to collect wind data for wind resource assessment is installing wind masts, which might not be feasible due to the cost or time constraints. Conducting qualified long term numerical simulations is classified as a new method for this purpose. In this study, WRF model experiments are evaluated for simulating wind field over east of Iran. Planetary Boundary Layer (PBL) physical parameterization plays an important role in the structure of simulated low level wind field. Evaluation of PBL schemes over the study area could be an essential issue for reduction of simulated wind errors. The ACM2, MYJ, MYNN2.5, QNSE and YSU PBL schemes are evaluated during July and December 2007. The MYJ PBL scheme showed the best performance for Fadeshk area. We then carried out one-year simulations for the whole of 2007 and simulated wind field and wind energy productions compared to the measurement wind data. Wind distribution during 2007 was simulated well with this PBL scheme, although it showed overestimations over 3 AM - 8 PM of day and underestimation over 8 PM -3 AM. Relative errors for shape parameter, scale parameter, mean of Weibull distribution and wind power are estimated equal to 13.2%, 5.54%, 4.85% and -0.47% respectively. Overall, model has good performance in simulation of wind energy parameters in this area.

Keywords: Wind power; PBL parameterization; WRF; Weibull distribution; Iran

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