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Simulation Sensitivities Study to the Wind Characteristics over Uttaradit Rajabhat University at Lamrang Thungkalo campus with WRF model

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This research is the WRF model initial application for wind investigation over Uttaradit Rajabhat University at Lamrang Thungkalo campus under some physical limitations. Its objective is to study weather simulation sensitivities specifically of wind characteristics over the campus on each domain sizes and on each season from selected time periods. Major three case studies are hot season case, rainy season case and cold season case. This experiment was conducted under two-way nested dynamical downscaling techniques, which nested domain (D02, 12km grid size) are within coarse domain (D01, 36km grid size). The National Centers for Environmental Prediction (NCEP) Final (FNL) operational global analysis data were used for initial and boundary conditions brought into WRF Preprocessing System (WPS). The cumulus physics process was controlled by Betts-Miller-Janjic (BMJ) cumulus parameterization, while simple ice scheme (WSM3) was used for microphysics. The NCAR Command Language (NCL) was utilized for graphic visualization. The results found that, WRF is firstly sensitive to domain size which finer domain can improve regional phenomena for coarser domain. Secondly, WRF can well simulate major winds in each case (southern wind in hot season, cyclonic flow in rainy season and northeastern wind in cold season). Thirdly, wind speeds in nested domain are mostly (greater than 50%) under light breeze (less than 3 m/s) agreed with all cases in coarse domain. Wind speeds in both domain were in accordance with TMD observed temporal variation. Fourthly, the vertical updraft was between -0.10 and 0.35 m/s which the highest speed was in hot season, while d02 enhance higher updraft than d01. Finally, high atmospheric stability can be detected from skew-T log P diagram during cold season case. Hence, WRF model can be applied to Uttaradit Rajabhat University at Lamrang Thungkalo campus to analyze the wind characteristics for all atmospheric levels.

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