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Simulation Study of the Wind Dynamics over Mont Tai during the Transition Periods

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Tai-An city located near the southern foothill of Mont Tai (117.105 °E, 36.256 °N, 1526 m a.s.l.) is known for severe ozone air pollution, frequent nocturnal surface ozone enhancement events, and especially the non-negligible contribution of ozone region transport, owing to diurnal thermally driven circulations induced by steep conical isolated topography. Therefore, In this study, mesoscale wind and temperature structure around Mont Tai region in summer 2018 is predicted by the Regional Atmospheric Modeling System (RAMS). After rigorous model validation, *viz.* the De Ridder's interpolation technique within the roughness sublayer and the statistical performance metrics, objectively ensuring the credibility of the simulation results, the *a priori* selection of Valley-wind days identifies are expected to be dominated by the thermally driven flow. We focus on the wind dynamic in the morning and evening transition periods on the valley-wind days. RAMS model not only reproduced the temporal sequence of the flow reversal between different above-ground heights, various local aspects and upstream/downstream positions but also captured the majority of energy transfer mechanisms during transition periods. Besides, we developed the code simulation of direct shortwave radiation included the topographic shadowing effect to repair RAMS missing module.