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Adaptation of computational model for prediction of dew formation in semi-arid conditions of Iran

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Artificially induced Dew formation could be an important secondary source of water, especially in semi-arid regions such as Iran. To characterize the amount of dew that could be collected in semi-arid region, we use a computationally efficient dew formation model. In this model, dew condenses on a condenser made with a horizontally aligned sheet; thermally insulated from the ground at a height of 2 m. The model valuate the powers involved in the heat exchange processes between the atmosphere and the condenser, for water or ice condensation. By doing iteration, The model algorithm integrates the prognostic equations for the mass and heat balance, describing in each step, the temperature of the condenser and the resulting condensation rate onto it. We run the model simulations for an urban (Tehran,1190 m asl) and coastal (Bandarabas, 10 m asl) area in Iran, using 10 years of meteorological reanalysis data as input. The model result shows a daily yield of dew of 0.07 mm and 0.13 mm, respectively for Tehran and Bandarabas. The highest daily yield rate is 0.55 mm in Tehran and 0.67 mm in Bandarabas. Dew fall is predicted during December–April in Tehran with an annual harvesting $\sim$26.44 mm. In contrast, the coastal region would experience dew formation during December–April and October–November with an annual harvesting $\sim$49 mm. This model is further used by combining data from 30 measurements stations (equipped with GAW stations) covering the whole domain of Iran during the last 38 years. The results of the model will be shown as well as potential place for dew collection panel installation.