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MODIS LST: A tool to generate high resolution temperature dataset in Iran

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Iran is located in an arid and semi-arid area of the world. Despite the importance of temperature in climatology and all related fields in the country, spatial and temporal resolution of the recorded temperature at weather stations are not adequate. To overcome these challenges, utilizing reanalysis data is recommended in lot of studies. ERA5 is one the most popular and promising reanalysis data sets. However, the spatial resolution of ERA5 data is not suitable for several usages such as flood modeling, agroclimatology analysis etc. Interpolation methods have been utilized to provide higher spatial resolution, but these methods contain lots of uncertainty and they usually do not have any physical basis. While, utilizing temperature laps rate (TLR) has been used to spatially interpolate station-based temperature data, insufficient number of stations or inadequate distribution of the stations would produce very uncertain TLR values. Land surface temperature (LST) censored by Moderate-resolution Imaging Spectroradiometer (MODIS) could provide a good spatially distributed data set to compute spatially continues TLRs. In the current study, MODIS LST was first used to estimate TLRs over Iran, and then these TLRs was employed to downscale ERA5 daily temperature data to 1km resolution. Improvements were observed in reanalysis temperature data in whole the country.
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