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Topographically informed high resolution temperature estimates for Sri Lanka

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Spatial mapping of climate data is conventionally done by spatial interpolation on station data. In the case of temperature, simple spatial interpolation techniques fail in capturing regional variations resulting from rapid elevation change in-between the stations in Sri Lanka. We used lapse rate theory to bring in the elevation dependency into the interpolation. Elevation data at 1-km resolution was used in the interpolation. Station temperature climatologies were projected on to a grid of 1km at an imaginary sea level datum using the environmental lapse rate Γ. The environmental lapse rate for each month was estimated from the monthly mean temperature and elevation of 37 stations. Thereafter, an inverse distance weighing method was used for the interpolation at the sea level datum. Then the temperature at every grid point was projected to take account of the topography. This permitted in producing more fine scale temperature estimation at 1 km^2 in place of original density of 1726 km^2/station. This procedure was used to construct annual and monthly spatial climatologies of minimum, maximum and mean temperature for Sri Lanka. The new interpolation method provided realistic values for temperature particularly in the mountainous areas.

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