

Warming over eastern India due to land use and land cover changes

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The anthropogenic forcing responsible for global warming and recent climate change are greenhouse gases and changes in land use and land cover (LULC). It is well accepted that the greenhouse gases are main causes of global warming and recent climate change, but changes in LULC are also contributing to a certain extent particularly in regional scale. In this study an attempt has been made to investigate the temperature trends (Warming or Cooling) over Eastern India based on 26 years (1981-2006) temperature datasets. The observed temperature trend shows that Eastern India is getting warmer with a rate of 0.077°C per decade during the said period. The contribution of LULC changes towards this warming is estimated by subtracting the temperature trend of reanalysis dataset from the temperature trend of observation dataset, called 'Observation minus Reanalysis' (OMR) method. The result shows that the changes in LULC give a cooling trend over Eastern India with a rate of 0.001°C per decade. Though this contribution of LULC does not look significant during 1981-2006, but the contribution of LULC over the region during 1981-1991 and 1991-2001 is estimated as -0.126°C and 0.164°C per decade respectively. This implies that the contribution of LULC towards the warming may be significant in future. An attempt is also made to investigate the changes in LULC over the same region based on four LULC satellite datasets during 1981-2006. The comparison of the change in temperature trend with the change in LULC shows that the cooling due to LULC changes is because of the conversions of open forest/ shrubs/ small vegetations into dense forest/ agricultural/ fallow land and the warming due to LULC changes is because of the conversions of shrubs/ agricultural/ fallow land into dry land.

Biography

Sridhara Nayak is a PhD student at Indian Institute of Technology Kharagpur, India. His research interest is to investigate the impact of Land Use and Land Cover (LULC) changes on regional climate over India using long time series of climate and LULC satellite datasets.

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