

# **Assessment of Air Quality Impacts During Heat Waves in Southeast India using The WRF-Chem model**

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### **Abstract**

Present study aims to investigate the impact of heatwaves on ozone concentration and meteorological parameters in southeast region of India, using Weather Research and Forecasting model coupled with Chemistry (WRF-Chem) model. The study compared surface ozone and maximum temperature during non-heatwave (NHW) and heatwave (HW) periods, then tested the model outputs against observational datasets. The WRF-Chem simulated output of meteorological and chemical variables was compared to various observational datasets. Almost all of the variables show a significant correlation between 80-95%. The findings indicate a positive correlation between temperature and ozone, with ozone concentrations reaching 75-78 ppbv under HW conditions. Day-to-day trend analysis reveals an increasing pattern of maximum temperature and surface ozone concentration on HW days. The diurnal cycle of O<sub>3</sub>, temperature, and PBLH peaked in the afternoon, but NO<sub>x</sub> and RH peaked at night. The study highlights the importance of integrating HW-driven ozone into account when developing long-term strategies to reduce regional ozone pollution, as heatwaves can considerably contribute to the rate of O<sub>3</sub> rise (22%). This finding might help policymakers in managing the rising concentration of surface ozone (bad ozone) in heat-prone areas. It also has significant consequences for the effective numerical forecasting of rising surface ozone levels.

### **Early Career Scientist**

NO, I am not an early career scientist.

### **IGAC Activities**

TOAR: Tropospheric Ozone Assessment Report, CCMi: Chemistry Climate Model Initiative

### **IGAC Regional Working Groups**

Southern Hemisphere Working Group