

National Aeronautics and Space Administration



Pacific Northwest Health & Air Quality

Monitoring Trends in Air Quality During a Drought Case Study to Improve Public Health Response to Drought Threats

Abby Sgan • Greta Bolinger • Tallis Monteiro • Cristina Villalobos-Heredia • Taylor West



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Study Area



- Pacific NorthwestWashington + Oregon
- Jan. 2015 Dec. 2022



Population of over 12 million people

Enduring prolonged drought



Prone to environmental disasters







Washington & Oregon State Boundaries

Objectives





Community Concerns

- Exposure to poor air quality is a public health concern
- Air quality is correlated with drought severity
- Air quality is also driven by secondary impacts of drought
 - Wildland fires, dust storms
- Poor air quality disproportionately
 impacts certain geographies
 - Vulnerable populations





Earth Observations: Satellites & Sensors





Terra MODIS (MAIAC)

Aqua MODIS (MAIAC)



Image credit: NASA

Ancillary Datasets

Dataset	Measurement	Spatial & Temporal Resolution	Indicates
Standardized Precipitation- Evapotranspiration Index (SPEI)	Water balance between precipitation & evapotranspiration	4 km / 270-day 2015 – 2022	Drought (Ancillary)
Environmental Protection Agency Air Quality System (EPA AQS)	PM2.5 and PM10	Daily 2015 – 2022	Air quality (Ground-based)

Methodology Data Processing





Methodology Data Analysis





Harney County, OR





Yakima County, WA



Limitations

- Wildfire vs drought influences on air quality
- County shapefile size
- Missing PM10 monitoring sites



Future Work

 $-\sqrt{-}$ Incorporate data to health outcomes.



Investigate the relation of wildfire events to air quality and drought.



Extend analysis to all counties in OR and WA.



Establish continuity between MODIS Climate Data Record (CDR) and VIIRS MAIAC Aerosol Optical Thickness (AOT).



Analyze atmospheric gases using Sentinel-5P TROPOMI to assess air quality in the region.



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