Bayesian spatio-temporal models for PM_{10} in the Po valley

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PM_{10}

Airborn particulate matter (PM) is a complex mixture of particles that varies in size and chemical composition.
For regulatory purposes particles are defined by their diameter measured in microns.

Where do they come from?

PM may be either directly emitted from sources (primary particles) or formed in the atmosphere through chemical reactions. PM10 are often emission from:

- combustion processes
- construction sites
- landfills and agriculture
- wildfires
- pollen
- fragments of bacteria

Health consequences

PM_{10} particles can be inhaled, and they deposit on the surfaces of the larger airways of the upper region of the lung inducing tissue damage and lung inflammation.
Short-term exposures to PM_{10} have been associated primarily with worsening of respiratory diseases leading to hospitalization and emergency department visits.
The effects of long-term exposure to PM_{10} are less clear, although several studies suggest a link between long-term exposure and respiratory mortality.

Limit values

For the protection of human health The EU and the OMS have set two limit values for particulate matter:

	Europe	OMS
annual limit	$40\mu g/m_3$	$20\mu g/m_3$
daily limit	$50\mu g/m_3$ max 35 days/year	$50\mu g/m_3$ max 3 days

Dataset

We have the measures of the concentration of PM_{10} taken from n station over the Po valley and from 2014
We are going to focus on the stations of Emilia Romagna and the measurements from 2018.

Objectives of the project

- create an ARIMA model that best represent the problem
- make predictions on the short term of the concentration of PM_{10}

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