



Modeling early warning of air pollution episodes over greater Cairo city (Egypt)

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Community Multiscale Air Quality model (CMAQ) was applied to help understand the origins of the Black Cloud Episodes often prevailed during October-November months starting from the year 1998 in Greater Cairo City. The studies confirmed the existence of 4 different types of episodic events.

Northern Episodes that strikes Greater Cairo City are caused by Northern winds or Northern components of winds laden with the products of burning of Rice straw and different Agricultural wastes, while, Southern Episodes are caused by Southern winds or Southern components of winds laden with pollutants provided from Cement, iron & steel industries and desert aerosols. Calm wind episodic events are provided from inside city activities such as power plants, traffics and enterprises etc... The fourth type of episodes is produced by a mixture of the previous types of pollutants that could strike Greater Cairo City in some occasions induced by variable weather conditions.

The harmful health effects led to an urgent need to explain, anticipate, and mitigate episodic events. A method has been developed modeling the inverse relationship between the height of the planetary boundary layer and the concentration of pollutants in addition to the contribution of the subsidence rate of the northerly or southerly driven pollutants.

Using the predicted weather elements, a short range forecasting system for Early Warning of Air Pollution Episodes (EWAPE) was developed to warn against air pollution concentration that exceeds the alert limits.