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Modelling the effect of severe storms in coastal pollution

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Modelling and simulation of real events can be very useful to prevent environmental disasters, but these disasters can affect the health and life of human beings; then such tools become definitively necessary for governmental authorities to avoid population risk.

In this wok we present a mathematical model that combines the effect of Mediterranean storms together with the effect of wastewater emissary dissolutions at the sea. The emissary model corresponds to a Catalan wastewater plant, the Besos plant in Barcelona. This plant throws the wastewater to the Mediterranean Sea with a 3-km pipe emissary, after a bacteriologically polluted secondary treatment. This polluted water is dissoluted in the salty water, provoking the death of all bacteria agents before they reach the coast. But in difficult conditions under violent storms, with strong East winds, the bacteriological polluted dissolution reaches the shore before the bacteria die and, therefore, a severe coastal pollution is produced.

Its consequence can incur in a public health problem and the different governmental agencies activate great alarms to avoid population hazard. Storms modelling permits to evaluate the risk of coastal pollution predicting the wastewater dissolution path and velocity. Several simulations are presented under different storm conditions, making this tool very useful for the environmental protection agencies in the Catalan government.