

Abstract Submitted
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Turbulent acidic jets and plumes injected into an alkaline environment HENDRIK ULPRE, University College London — The characteristics of a strong acidic turbulent jet or plume injected into an alkaline environment comprising of a weak/strong base are examined theoretically and experimentally. A chemistry model is developed to understand how the pH of a fluid parcel of monoprotic acid changes as it is diluted and reacts with the ambient fluid. A standard fluid model, based on a top-hat model for acid concentration and velocity is used to express how the dilution of acid varies with distance from the point of discharge. These models are applied to estimate the point of neutralisation and the travel time with distance within the jet/plume. An experimental study was undertaken to test the theoretical results. These experiments involved injecting jets or vertical plumes of dilute nitric acid into a large tank containing a variety of base salts dissolved in water. The injected fluid contained litmus indicator dye which showed a change in colour from red to blue close to the point of neutralisation. In order to obtain a range of neutralisation distances, additional basic salts were added to the water to increase its pH buffering capacity. The results are applied to discuss the environmental implications of an acidic jet/plume injected into the sea off the South East coast of Great Britain.

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