

# **Predictability of Particle Trajectories in the Ocean**

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## **LONG-TERM GOALS**

The long term goal of this project is to determine optimal sampling strategies for drifting buoys, in order to enhance prediction of particle motion in the ocean, with potential applications to ecological, search and rescue, the floating mine problems, and design of observing systems.

## **OBJECTIVES**

The specific scientific objective of the work done has been to determine the effectiveness of using in-situ Lagrangian measurements and data assimilation techniques in improving the prediction of particle trajectories.

## **APPROACH**

The work is based primarily on simple probabilistic models of particle motion and data assimilation strategies. It also involves the use of ocean general circulation models and processing of oceanic data.

## **WORK COMPLETED**

The primary accomplishments during this grant period are as follows:

- 1) A comprehensive testing and validation of a method, which relies on assimilation of Lagrangian data into Lagrangian particle models in order to estimate the velocity field in the vicinity of buoy trajectories and to address the problem of prediction of Lagrangian trajectories have been completed, leading to the publication of 3 papers (Ozgokmen et al., 2000a; Castellari et al., 2001; Ozgokmen et al., 2001).
- 2) A new algorithm is developed based on the motion of the center of mass of a drifter cluster. This method is tested using stochastic flow simulations and real oceanic drifters. This study is submitted for publication (Piterbarg and Ozgokmen, 2001).
- 3) The impact of in-situ wind forcing on the reconstruction of drifter trajectories is investigated. This manuscript is submitted for publication (Paldor et al., 2001).

# Report Documentation Page

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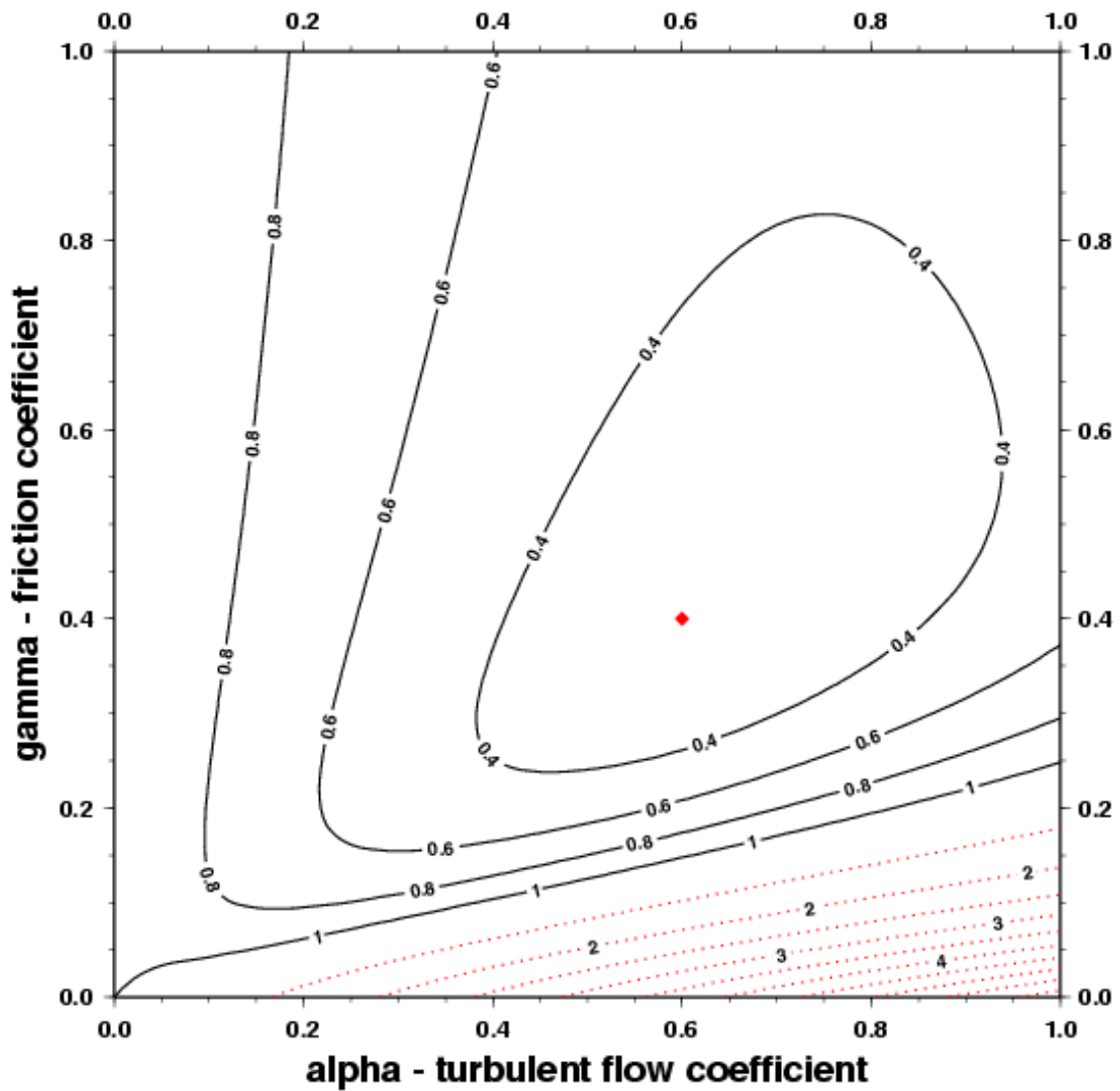
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*Figure 2: Sensitivity of the relative error, prediction error scaled by dispersion, to the model parameters for one of the drifter clusters in the Pacific Ocean. Note that the minimum error is robust with respect to variations in model parameters, alpha – turbulent flow coefficient and gamma - friction coefficient.*

## **PUBLICATIONS (2000-2001)**

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