

IMAGE ANALYSIS OF SCALAR DISPERSION IN A SURFACE JET

Background

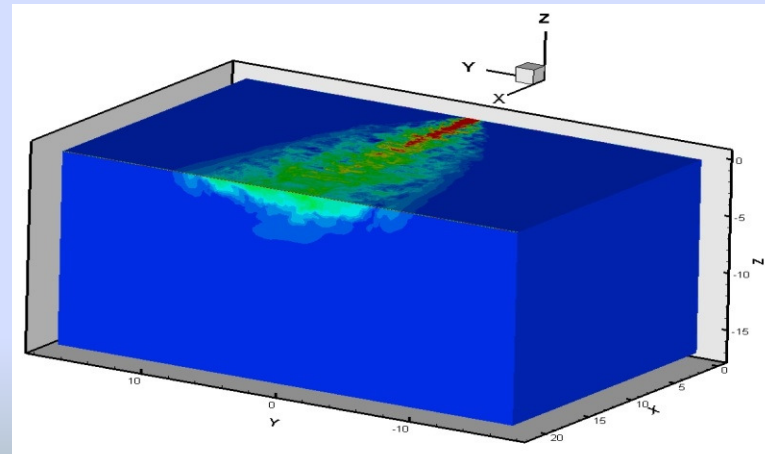
Surface jets are jets delivered at or near the free surface of a fluid. Surface jets are used for modeling the discharge of pollutants into large reservoirs.

Objective

- To study video recordings of a surface jet, obtained from PLIF experiments.
- To create a model to describe the spread of a scalar within a surface jet for comparison with DNS predictions.



Surface jets discharging suspended particles



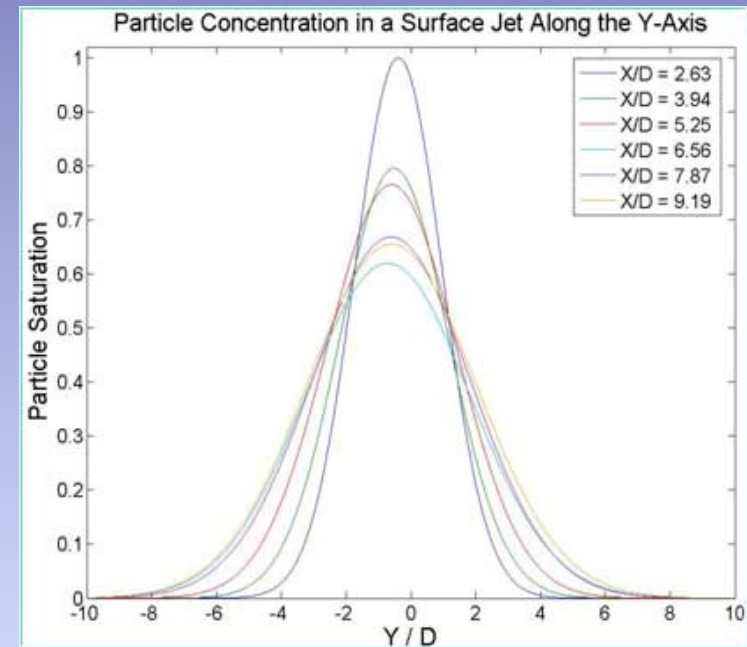
*Direct Numerical Simulation (DNS)
of a surface jet*

Research Carried Out

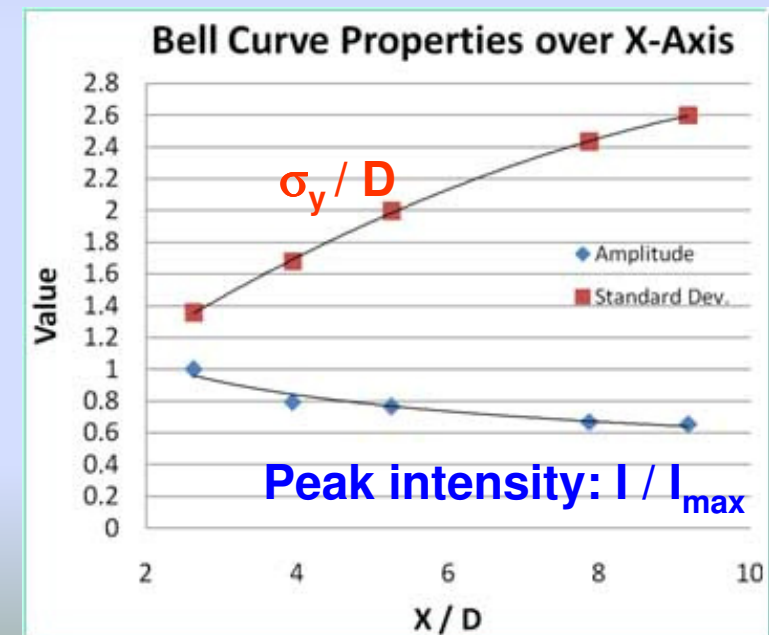
- Video recordings of a surface jet were digitized and analyzed.
- The results were statistically modeled to fit Gaussian curves.
- These were analyzed to determine the spread (σ_y) of the scalar concentration in the downstream direction.

Key Findings

The curves that describe the average intensity across the jet (y direction), have a peak intensity and a standard deviation that vary consistently in the downstream direction (x).



Gaussian fit to averaged image intensities



Variation of Gaussian fit in x direction