Assimilation of remotely sensed wave breaking data and numerical model results: AN APPROACHO TO ESTIMATE NEARSHORE BATHYMETRY

Francisco J. Soto

Universidad Técnica Federico Santa María, Valparaíso, Chile

Introduction

The nearshore is the narrow portion of the oceans in contact with continental land. Despite its relatively limited extent, it is an extremely dynamic area where hydrodynamic and morphodynamic process interact over a wide range of temporal and spatial scales. At the same time, it is one of the areas most dear to humans, for reasons that span from recreational to economic activities. A **predictive understanding of the nearshore** is relevant for many aspects of human endeavors.

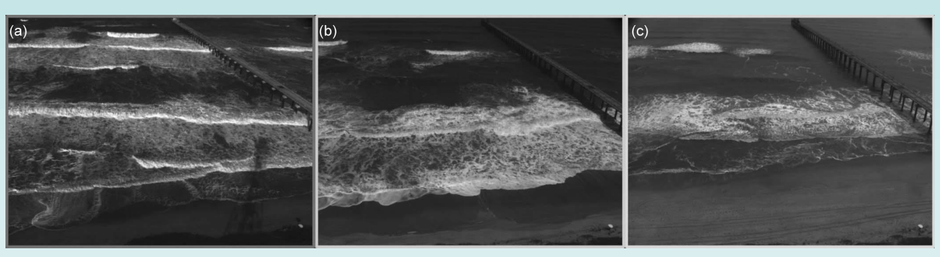
An approach to this long term goal is to use numerical models combined with remotely sensed observations to obtain optimal estimates of the state of nearshore hydrodynamics – in terms of surface waves and circulation patterns – and bathymetric variability.

Objective

Implement data assimilations methods to combine results from a numerical model and remotely sensed observations of the state of the ocean surface, to obtain estimates of bathymetry and circulation predictions.

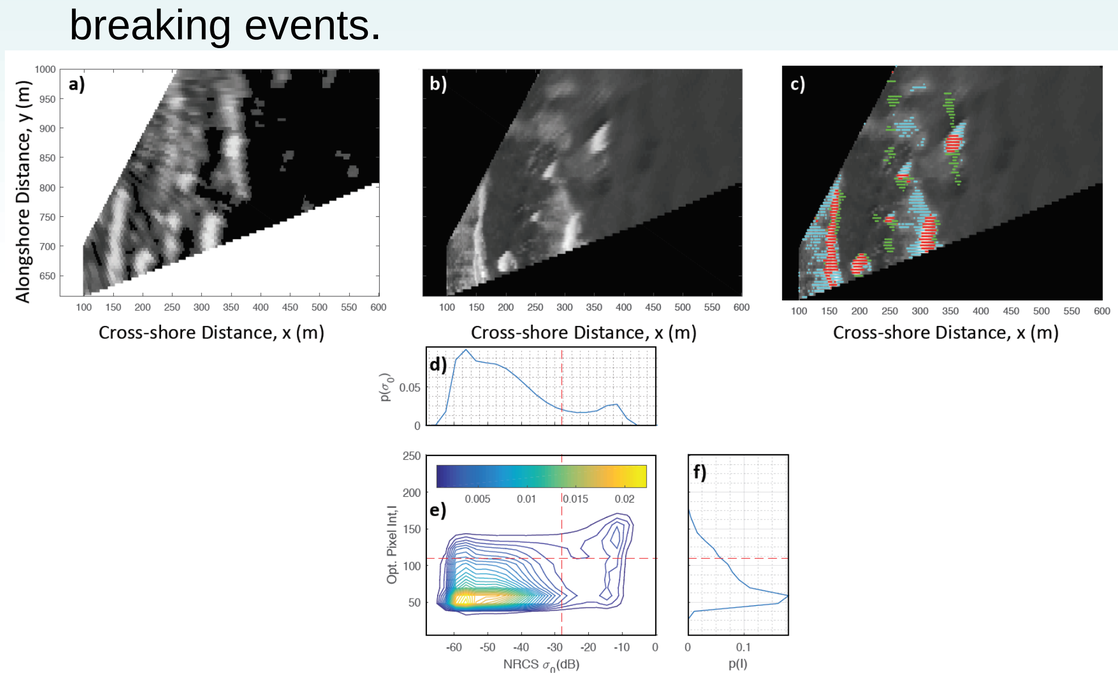
Methods

1. Remote sensing of the nearshore.



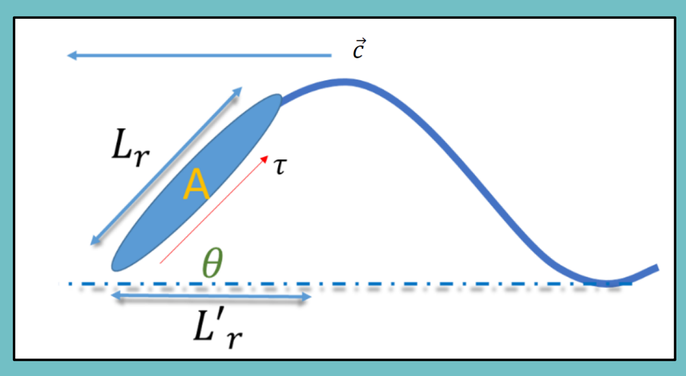
Source: Catalán et al. (2011)

2. Data processing algorithms: detection of wave breaking events.



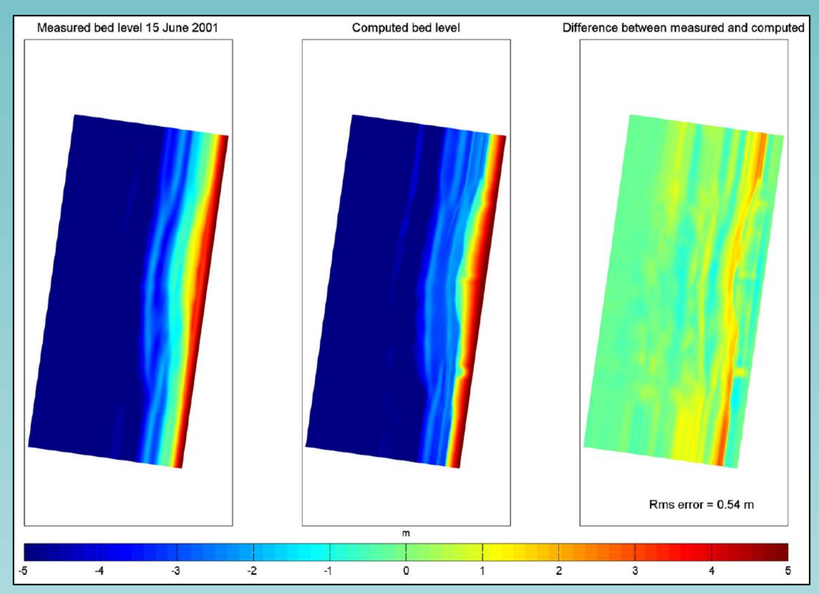
Source: Díaz et al. (2017)

3. Relate remotely sensed data to hydrodynamic quantities: wave breaking energy dissipation and celerity.

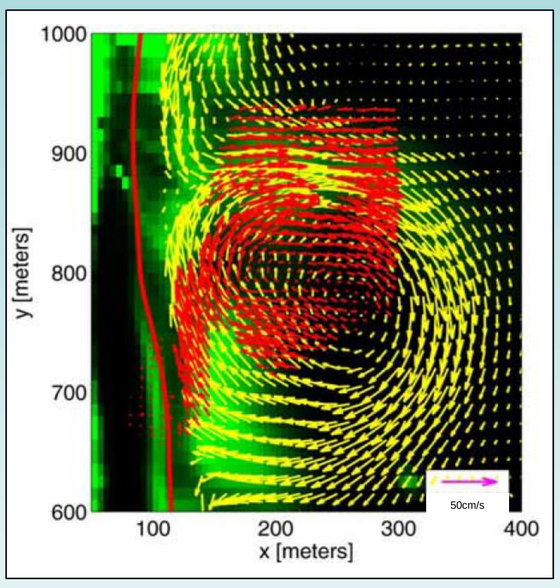


4. Get predictions from a numerical model and updates by assimilation with remotely sensed data.

Previous efforts



Source: van Dongeren et al. (2008)



Source: Wilson et al. (2014)

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