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**CONTROL ID:** 744278

**TITLE:** The Structure of Headland Eddies and their Role in Sandbank Formation: an In Situ and Modeling Study

**PRESENTATION TYPE:** Assigned by Committee

**SECTION:** Geological Oceanography (GO)

**ORIGINAL SESSION AUTHOR SUBMITTED TO:** Sediment Processes I: Transport and Deposition in Lakes, Estuaries, Coastal Bays, and Continental Shelves (GO05)

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**INSTITUTIONS (ALL):** 1. School of Ocean Sciences, Bangor University, Menai Bridge, United Kingdom.

**Title of Team:**

**ABSTRACT BODY:** It has been suggested that the outward-directed centrifugal force within a headland eddy is balanced by an inward-directed pressure gradient, leading to a convergence of bedload material, and the formation of associated headland sandbanks. I examine an in situ dataset of ADCP, transmissometer, and LISST particle size collected over 2 tidal cycles through a headland eddy system in the Irish Sea. However, this headland eddy system is complicated by the presence of an island further offshore, which generates an additional island wake eddy system, and additional sandbanks. The in situ data describe the vertical and lateral structure of these headland/island eddy systems (Fig. 1), and show that at times of peak vorticity, sediment concentrations within the eddies increase from near the bed to the surface, despite water depths of 30-40m (Fig. 2). The data also demonstrates the convergence of bedload material at the center of the headland/island eddies. The in situ data were used to validate a 3D numerical model of the headland/island eddy system, leading to a proposed mechanism for headland sandbank formation in the presence of an island further offshore.

**INDEX TERMS:** [3022] MARINE GEOLOGY AND GEOPHYSICS / Marine sediments: processes and transport, [4217] OCEANOGRAPHY: GENERAL / Coastal processes.

(No Table Selected)

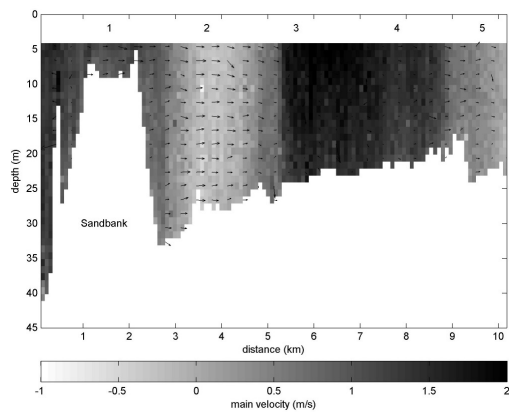


FIGURE 1. ADCP velocity structure through headland/island eddy systems. The gray scale is the main velocity component, and vectors show the lateral and vertical components of velocity. Numbers 1-5 show the positions of the profile stations. The island wake is centered at station 2, and the headland eddy close to station 5.

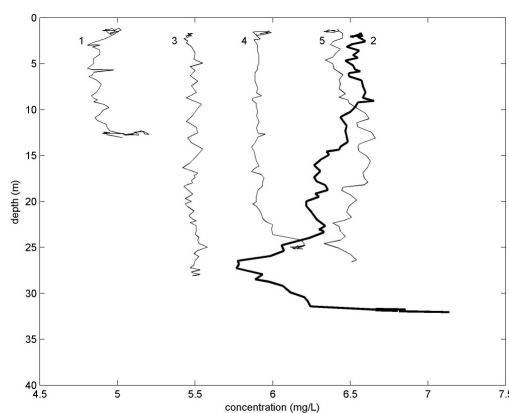


FIGURE 2. In situ profiles of sediment concentration. Profile 2, through an island wake, shows sediment concentration increasing with height above the bed. The locations of the stations are shown on Fig. 1.

#### **Additional Details**

#### **Scheduling Request:**

**Previously Presented Material:** None of the in situ data has been presented before. Results using idealized model domains of the study region have been presented before in *Estuar. Coast. Shelf S.*, but this is the first presentation of results for realistic modelling domains.