

AN OPTICAL ASSESSMENT OF THE NELSON/HAYES RIVER PLUME DISPERSION EXTENT IN HUDSON BAY (CANADA)



Atreya Basu^a, Greg McCullough^a, David Barber^a, Anirban Mukhopadhyay^a, David Doxaran^b, Simon Bélanger^c, and Jens Ehn^a

^a Centre for Earth Observation Science, University of Manitoba, Winnipeg, MB, R3T 2N2, Canada

^b Observatoire Océanologique Laboratoire d'Océanographie de Villefranche, 06230 Villefranche-sur-Mer, France

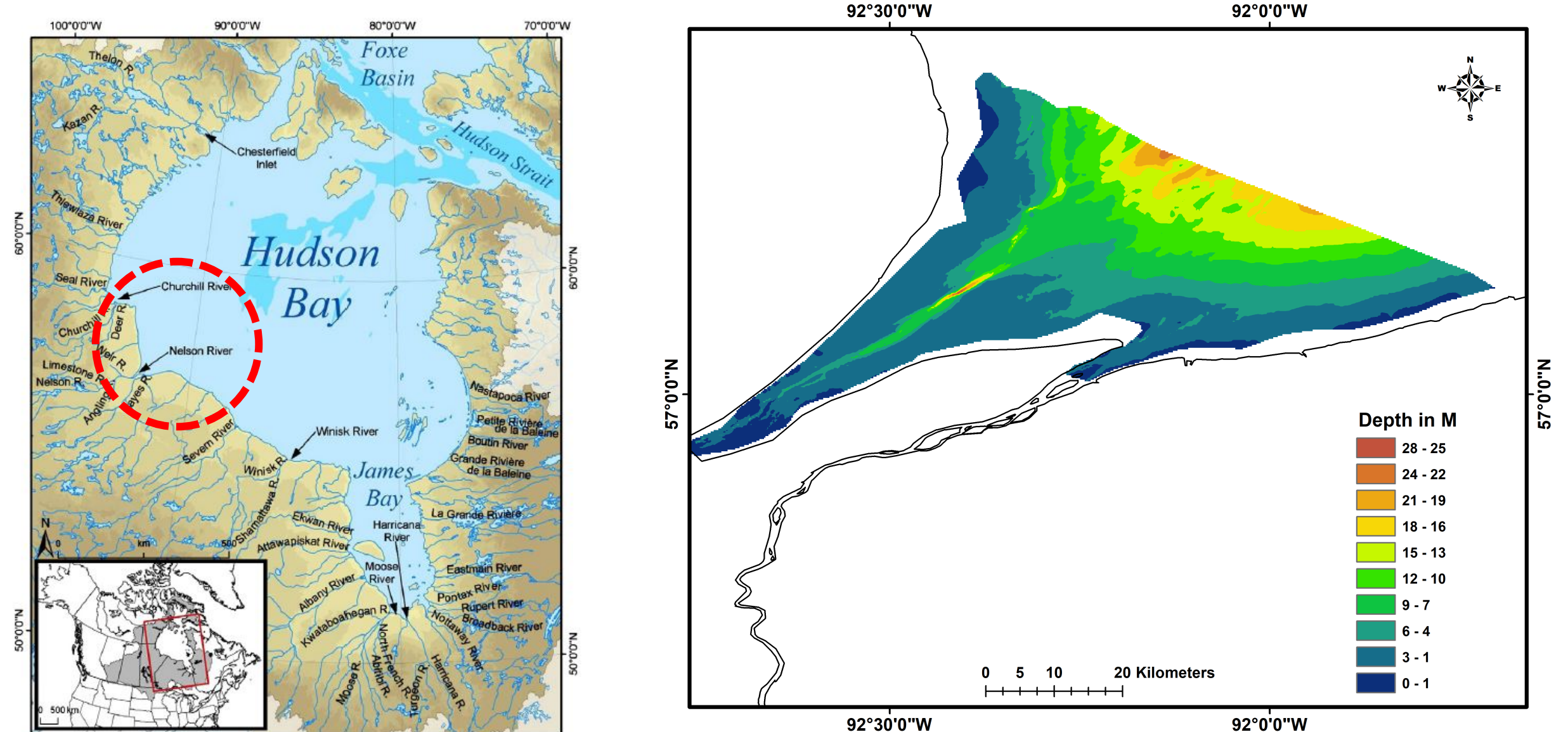
^c Département de Biologie, Chimie et Géographie, Université du Québec à Rimouski, Rimouski, QC, G5L 3A1, Canada

University of Manitoba

Introduction

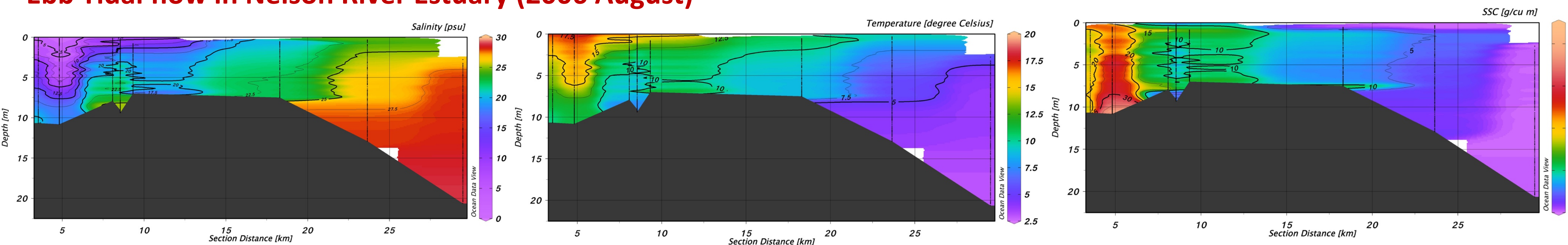
The Nelson/Hayes River (NHR), located in the southwestern edge of the Hudson Bay (HB) (Canada) (Fig. 1) contributed approximately 47% of the mean annual discharge of the western HB during the period 1964-2013 (Déry et al, 2016). This voluminous freshwater input controls the ocean processes in the south western to southern HB. Moreover hydroelectric regulation of the Nelson River has modified the discharge resulting in an increased winter discharge and flattened summer hydrograph. This called for a need to investigate the revised seasonal signals of the river runoff in a spatio-temporal scale.

Ocean color remote sensing approach provides a convenient way to study the mixed layer processes within the photic depth limit (Wozniak et al, 2010). This study has attempted to detect the NHR plume dispersion limit using color dissolved organic matter (CDOM) as the ocean color proxy for terrestrial discharge, (Fichot et al, 2013).

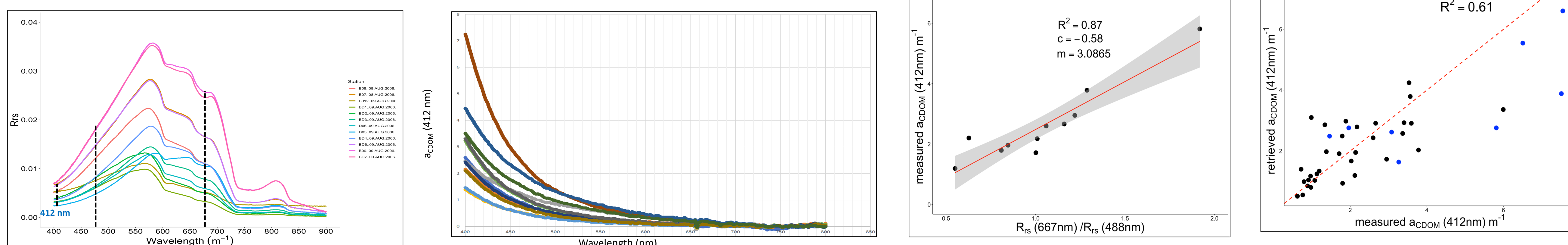


Research Questions: What is the extent of NHR plume disperse in Hudson Bay? Can satellite retrieved $a_{CDOM}(412nm)$ be used a river water tracer?

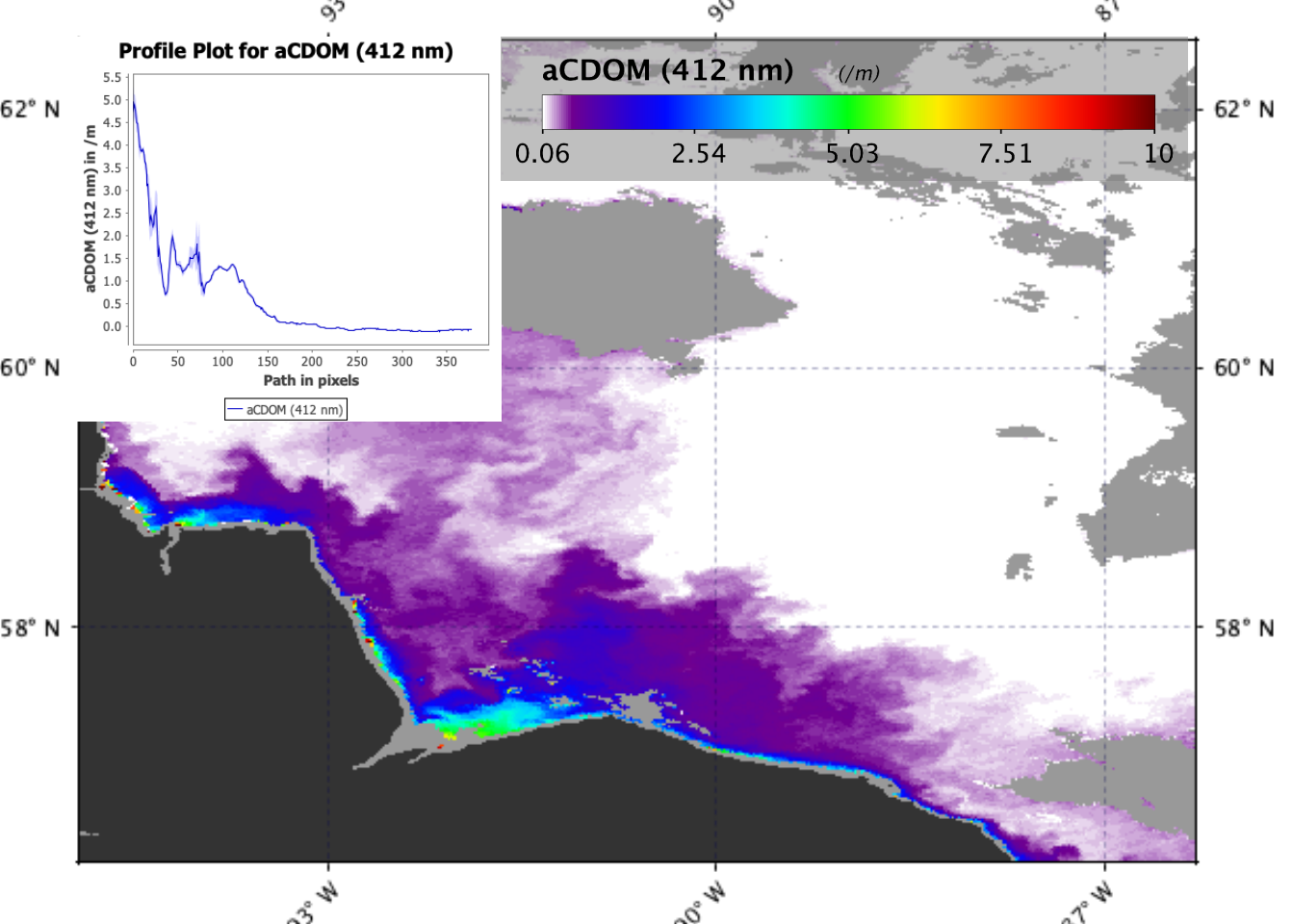
Ebb Tidal flow in Nelson River Estuary (2006 August)



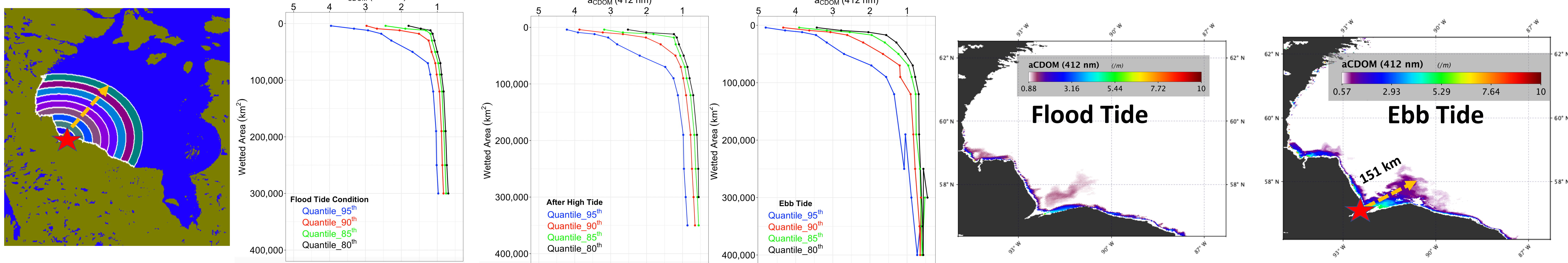
$a_{CDOM}(412 nm)$ Optical Algorithm



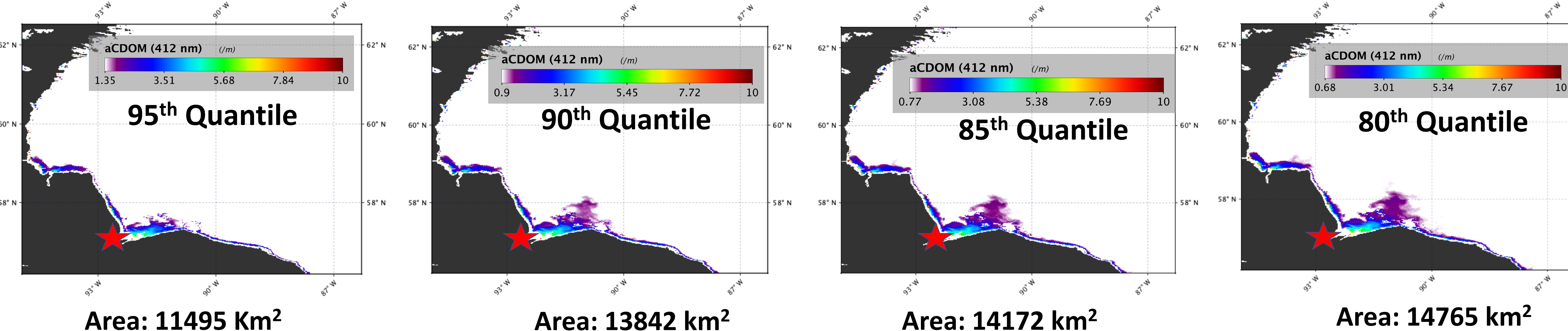
MODIS AQUA



Novel Quantile-based Approach for River plume dispersion limit detection (August 2006)



Plume dispersion Study: Ebb Tide Quantile Thresholding



Acknowledgement

