#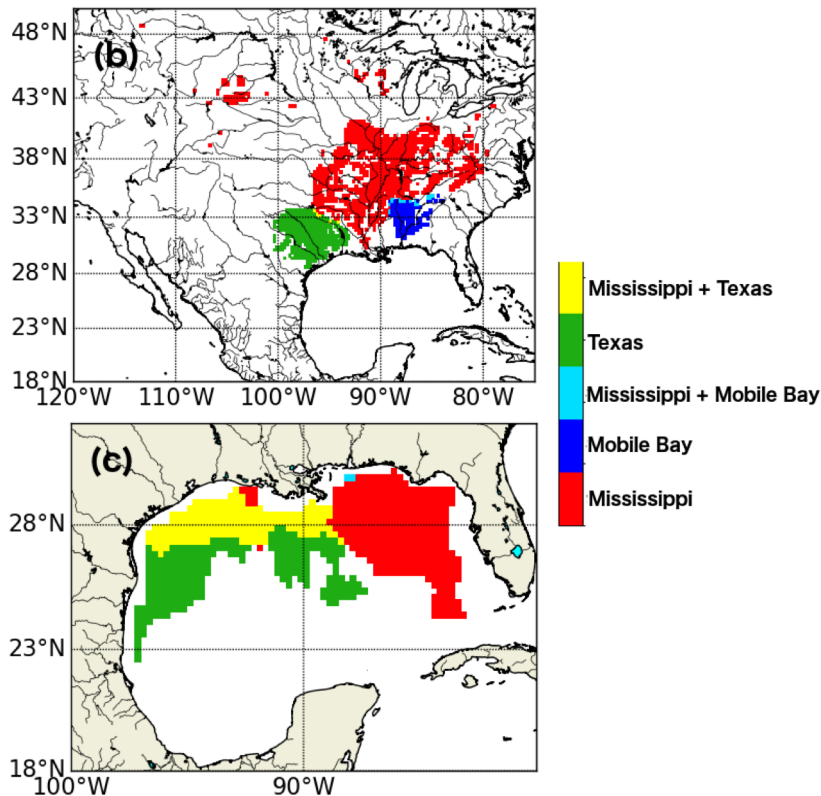 Statistical mapping of freshwater origin and fate signatures as land/ocean 'regions of influence' in the Gulf of Mexico

Séverine Fournier

(b) Regions on land influencing the Mississippi, Mobile Bay and Texas rivers. (c) Regions in the Gulf of Mexico influenced by each river basin

Problem: For each coastal Gulf of Mexico (GoM) region, from which rivers the freshwaters are sourced, and further, which upstream land areas contribute most to generate runoff into those source rivers?

Finding: A map of the regions on land which have the largest effect on local river discharge shows direct source regions for the GoM in the southeastern Mississippi basin at 16 days lead time, in the Mobile Bay and Texas basins at 3 days lead time.

A map of the unique contribution of individual river discharge forcing to specific features of river plume structure across the GoM shows regions influenced by each of the three sources of freshwater at lag times from weeks to several months.

Significance: Land and ocean satellite observations (e.g., SMOS and GPM/TRMM) provide information on the source and timing of hydrology impacts in the ocean. This helps to trace and monitor the forcing source for freshwater and nutrient inputs into the ocean which have impacts on biology, circulation and air-sea interactions.

Fournier S., J.T. Reager, B. Dzwonkowski, and J. Vazquez-Cuervo (2019). Statistical mapping of freshwater origin and fate signatures as land/ocean 'regions of influence' in the Gulf of Mexico. Journal of Geophysical Research: Oceans, doi:10.1029/2018JC014784