


Analysis of River Plume Remote Sensing Data

A satellite image showing a large river plume extending from a coastline into the ocean. The plume is characterized by a distinct greenish-brown color, indicating high concentrations of suspended matter or chlorophyll. The coastline is visible on the right side of the image, with the land area showing green vegetation and brown terrain. The ocean is a deep blue color, contrasting with the lighter, turbid water of the plume.

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Northern California Sediment Plumes:

Wet winters drive outflow from coastal estuaries

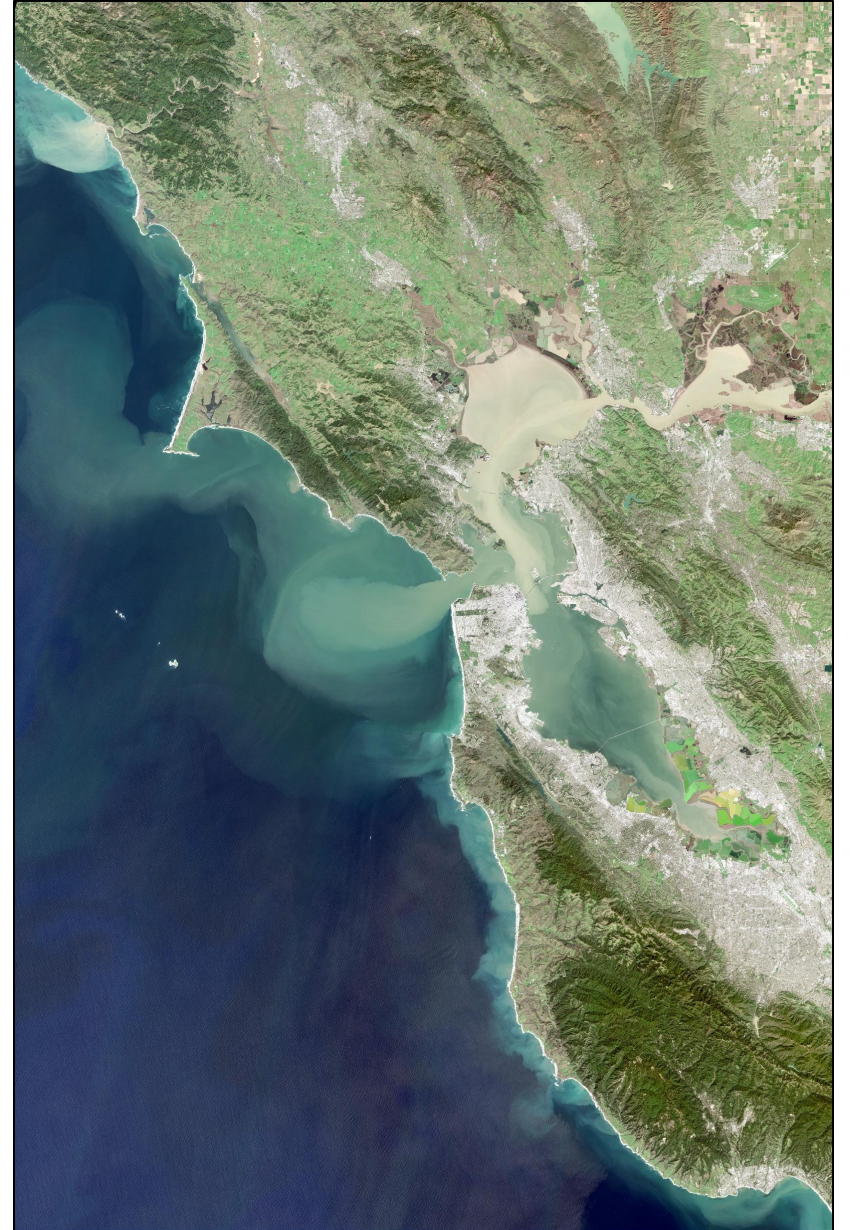
- *Supply 81% of shelf sediments (Griggs and Hein, 1980)*

Sediments are integral to life on and offshore

- *Light attenuation*
- *Species & Nesting Habitat*
- *Land Buffer*

Human Impact Sediment Supply Cycles

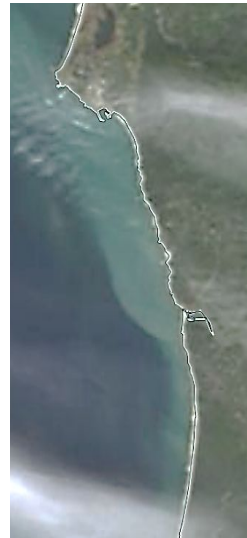
- Climate Change
- Development



Large Plumes:

Primarily Coriolis driven

Some wind impacts, but less the larger they get



Small Plumes:

Less controlled by Coriolis, more by variable, non rotational forces

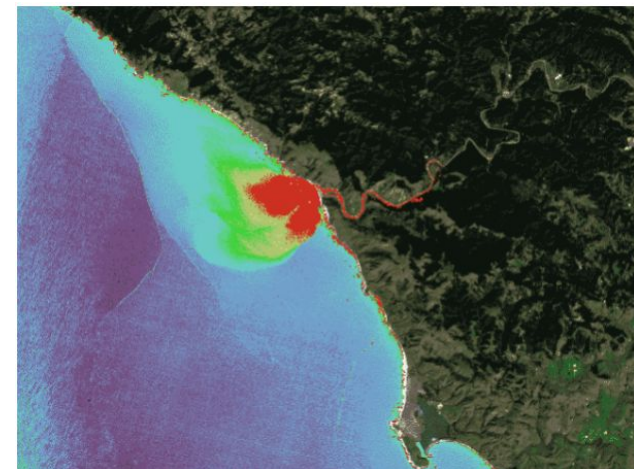
More typical and impactful in CA (Warrick and Fong, 2004)

Less Documented and modeled



Data Background: Suspended Sediment Reflectance

- Remote sensing great for ground truthing spatial models
- *Multispectral satellites*: multiple sensors that measure radiance of different wavelengths of light (red, green, blue, non-visible)
- For nearshore processes, *red color reflectance magnitude (Sr) correlates with suspended sediment turbidity*



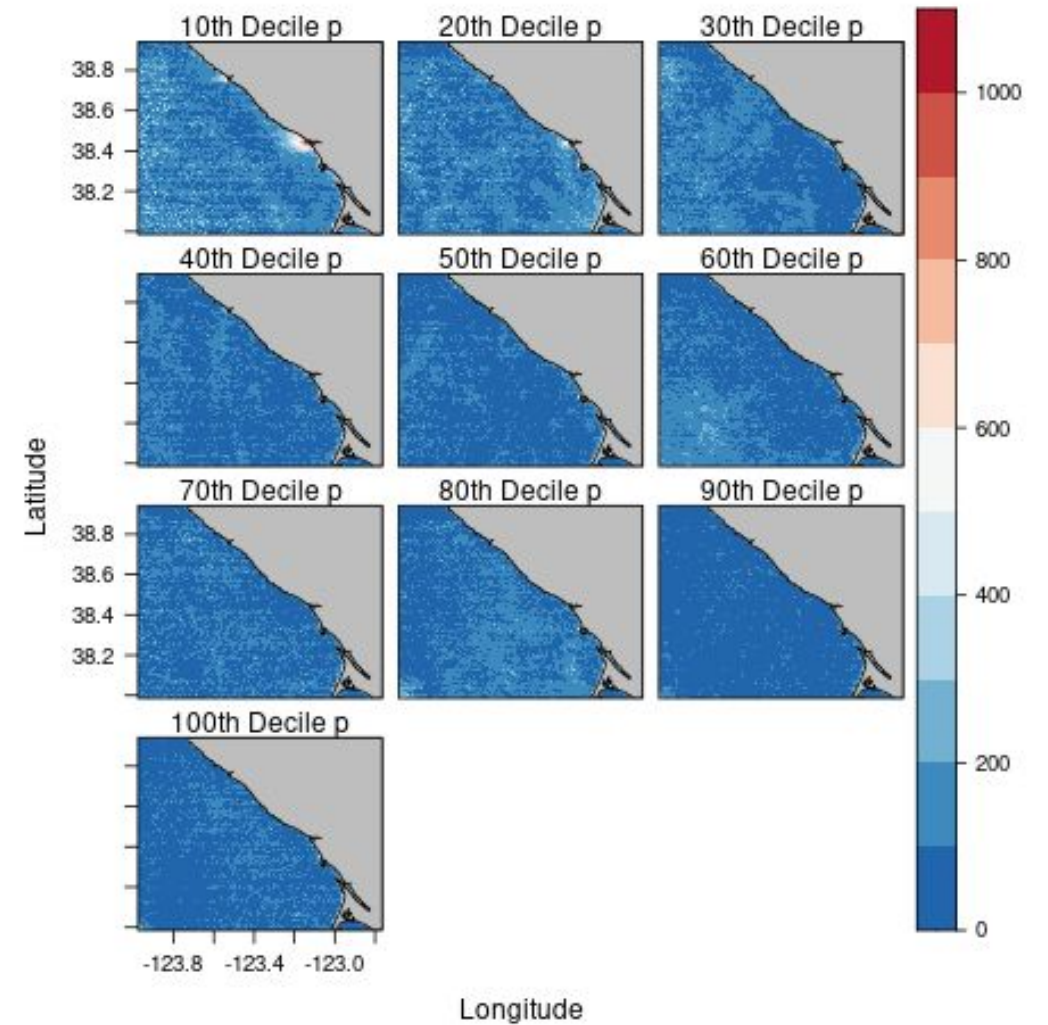
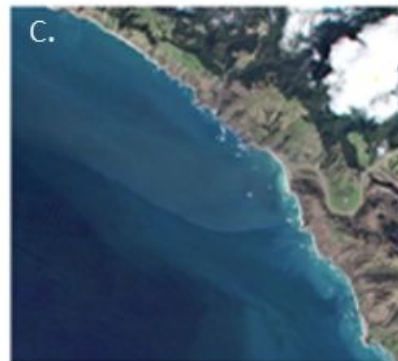
Sr-1



Methods: Average Composites

Average composites of data catalogues to look at average plume responses

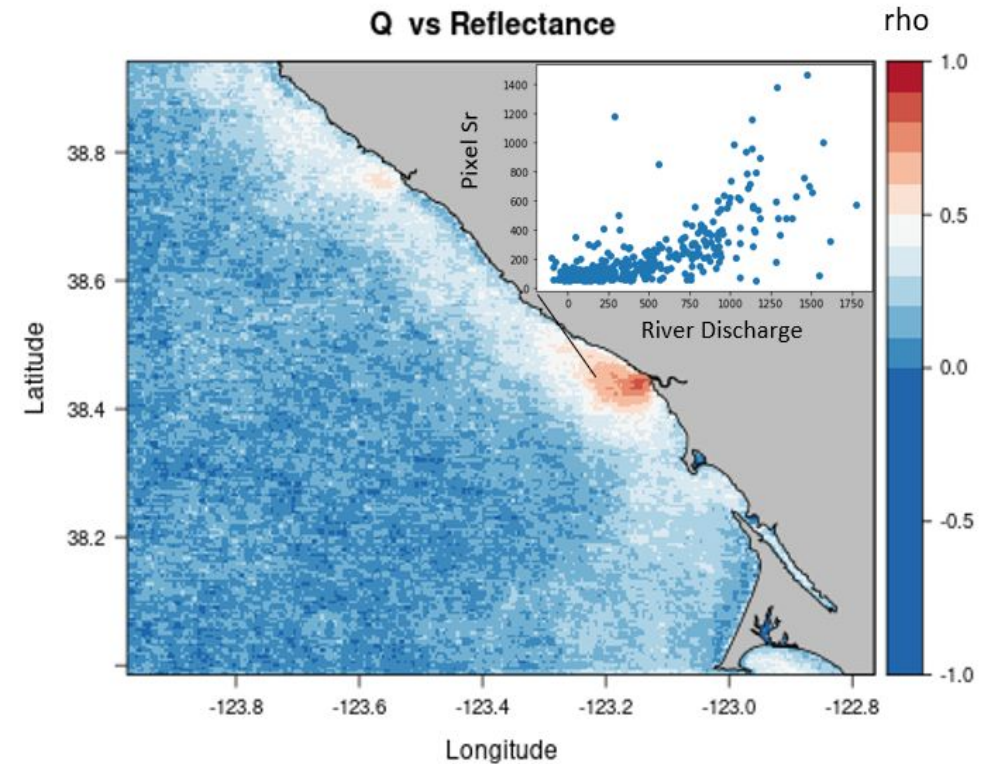
For example: when does wave energy overcome river momentum?



Methods: Pixelwise Statistics

Analysis of timeseries pixel data at each position vs monitoring data

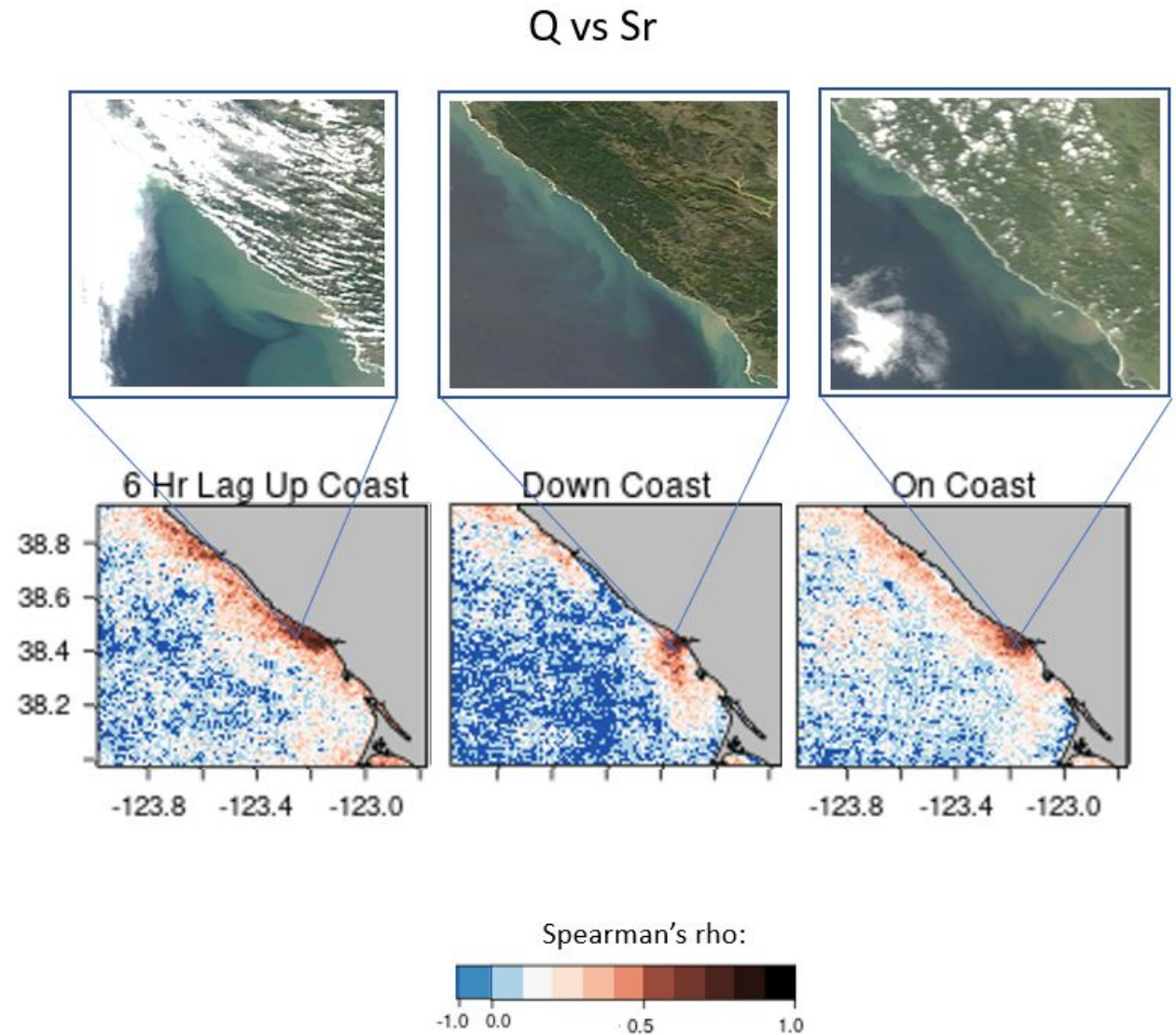
E.g.: Pixelwise Spearman's rho: Sr vs River Discharge



Small Plume Wind Response

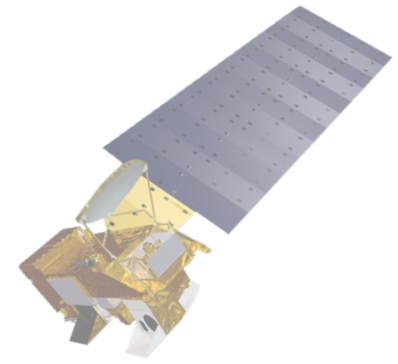
Can observe these correlations in conditional subsets:

E.g.: Q vs Reflectance, subset by wind direction





Thanks so much for listening!



Questions?

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