Don't Look Up:

Practical Methods for Incorporating Satellite Data in Monitoring Columbia River Ecosystems

*Austin Hudson[1,4], **Matthew Brand[2], Heida Diefenderfer[2], Stefan Talke[3],**

David Jay[4], Will Templeton[5], Maggie Mckeon[2]

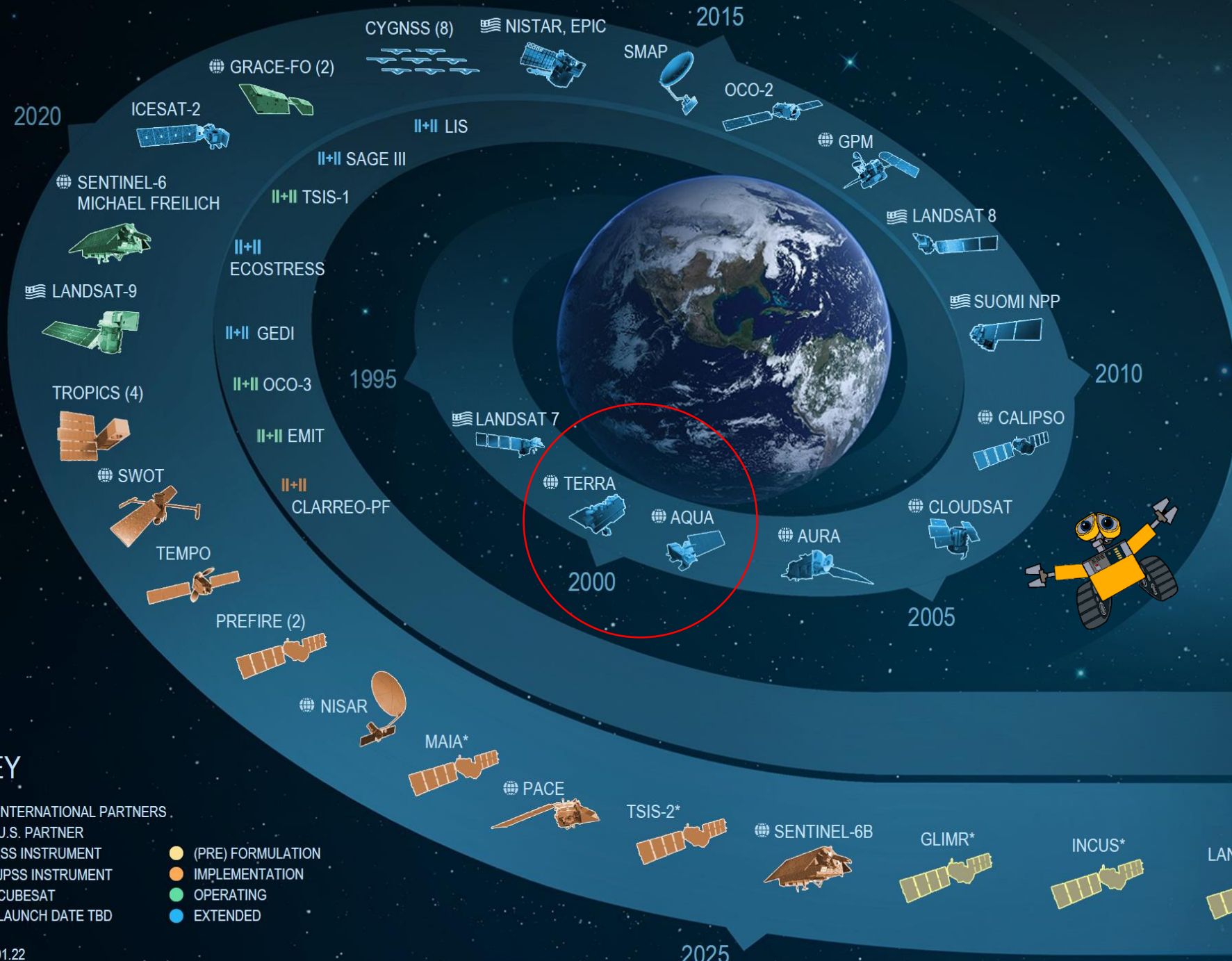[1]Fluvial Designs & Consulting, Mosier, OR

[2]Pacific Northwest National Laboratory, Sequim, WA

[3]California Polytechnic State University, San Luis Obispo, CA

[4]Portland State University, Portland, OR

[5]Coastal Geologic Services, Bellingham, WA

*Presenting author (email: fluvialdesigns@gmail.com)

National Aeronautics and Space Administration

NASA

MODIS (Terra & Aqua)

- 250-meter resolution
- 1 day return period
- > 20 years of data
- Channel 1: 620-670 nm

2015

CYGNSS (8)   NISTAR, EPIC   SMAP   OCO-2

GRACE-FO (2)   GPM

2020   ICESAT-2   II+II LIS   LANDSAT 8

II+II SAGE III

SENTINEL-6   II+II TSIS-1   SUOMI NPP
MICHAEL FREILICH

II+II ECOSTRESS   2010

LANDSAT-9   II+II GEDI   CALIPSO

1995

TROPICS (4)   II+II OCO-3   CLOUDSAT

II+II EMIT   LANDSAT 7   AURA

SWOT   CLARREO-PF   TERRA   AQUA   2005

TEMPO   2000   OMPS-LIMB 2022
    LIBERA 2027
    OMPS-LIMB 2027
PREFIRE (2)   OMPS-LIMB 2032

NISAR

MAIA*   **ISS INSTRUMENTS**

KEY   PACE

TSIS-2*   SENTINEL-6B   GLIMR*   INCUS*   LANDSAT NEXT*   ESO-1, 2, 3, 4*

🌐 INTERNATIONAL PARTNERS
🏴 U.S. PARTNER
II+II ISS INSTRUMENT   (PRE) FORMULATION   **MISSIONS**
+— JPSS INSTRUMENT   IMPLEMENTATION
⬡ CUBESAT   OPERATING
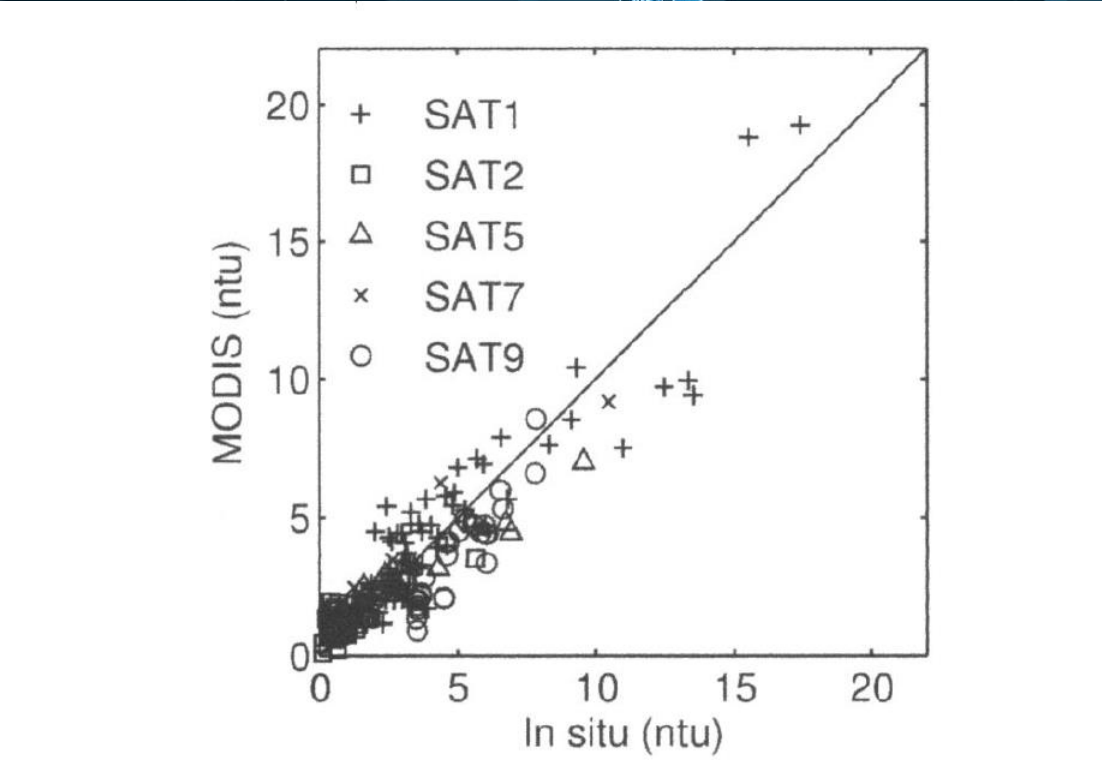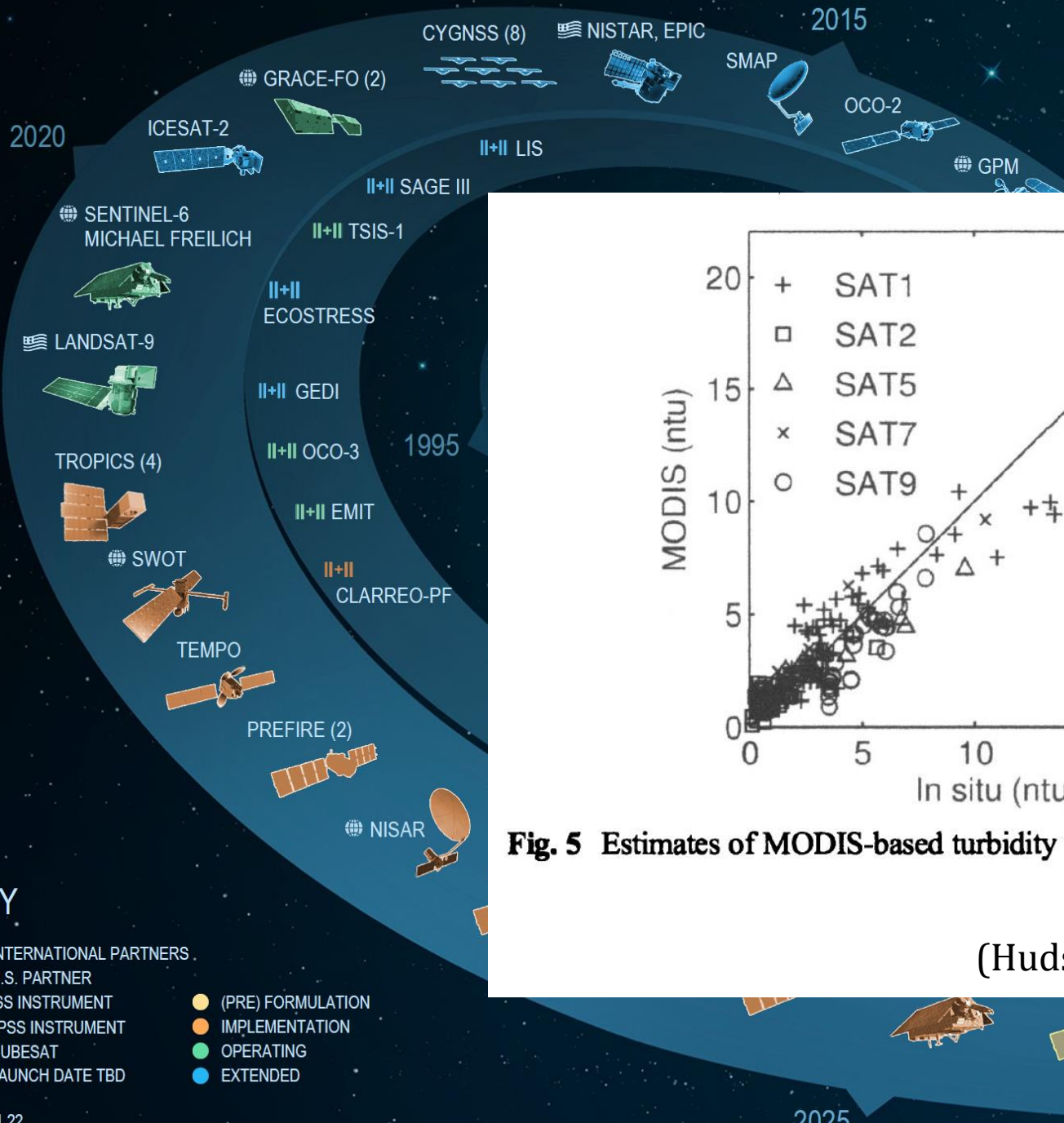★ LAUNCH DATE TBD   EXTENDED

2025

102.01.22

Fig. 5 Estimates of MODIS-based turbidity vs. in situ measurements

(Hudson et al. 2017)

MODIS (Terra & Aqua)

- 250-meter resolution

- 1 day return period

- > 20 years of data

- Channel 1: 620-670 nm

08-Jan-2022 16:00:00

Plume

Astoria

Estuary
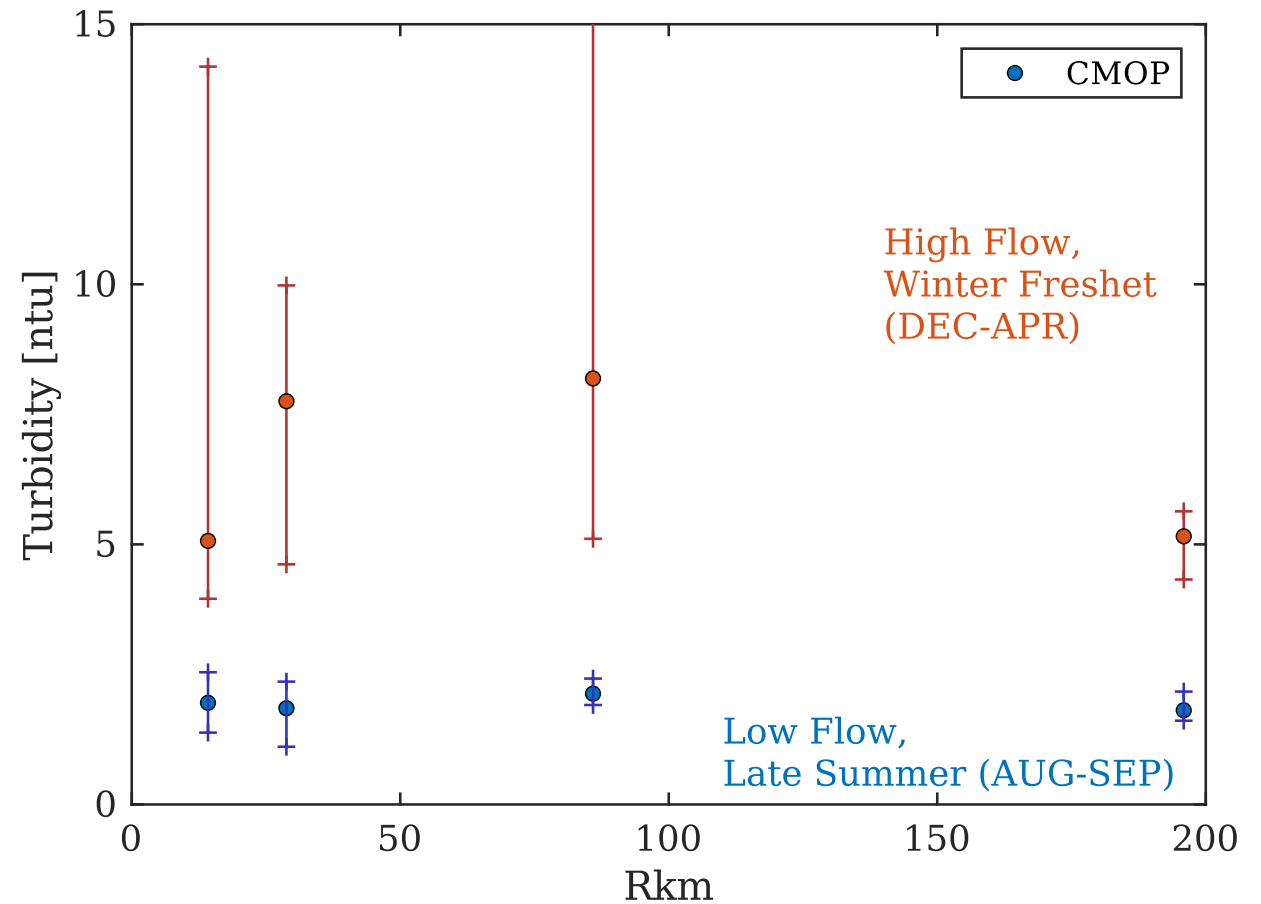Turbidity
Maximum

Cowlitz
River

Low
turbidity

Portland
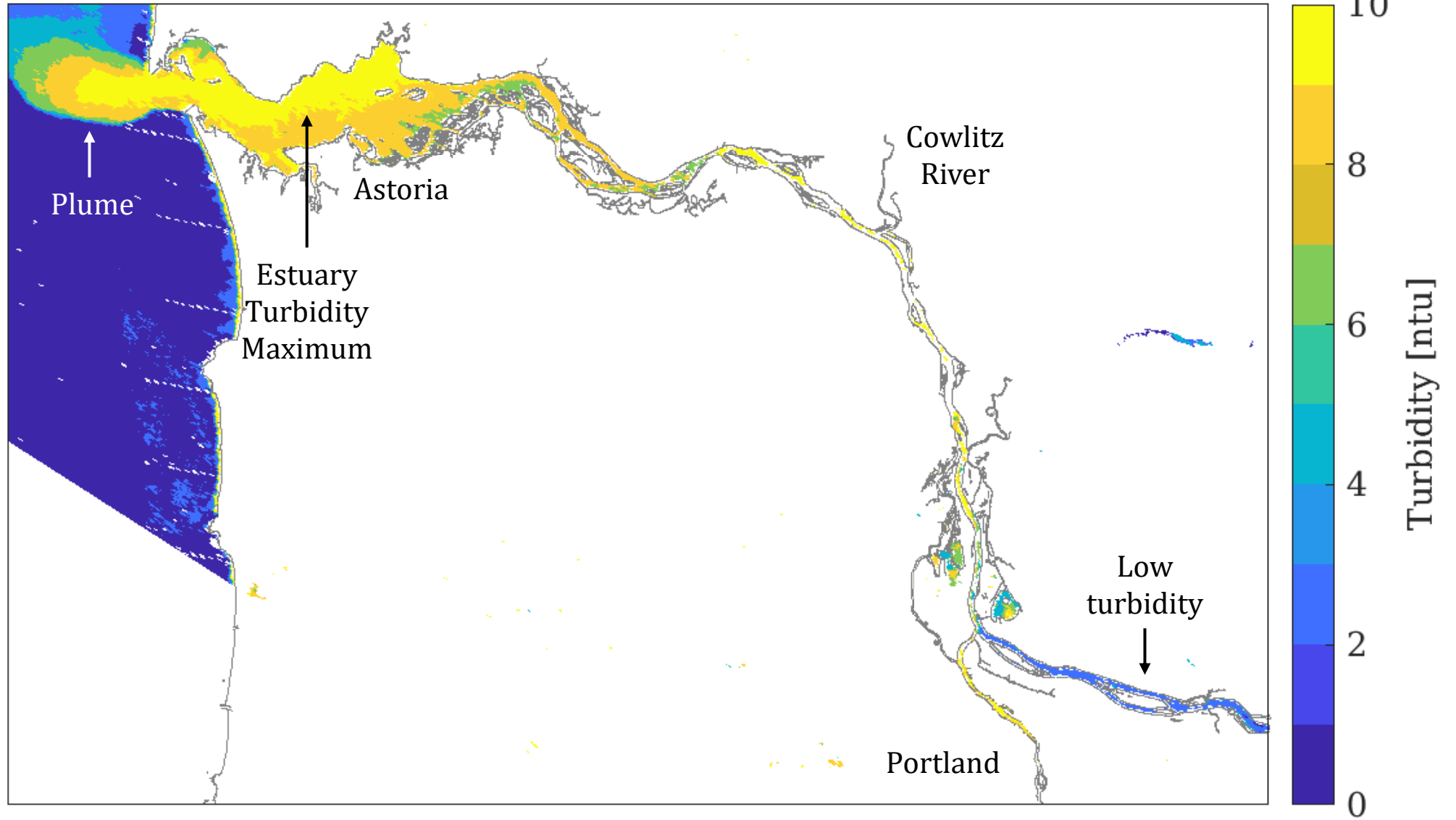
Turbidity [ntu]

Resolving Spatial Patterns

How does turbidity
change with river
discharge?

Data collected by CMOP and averaged
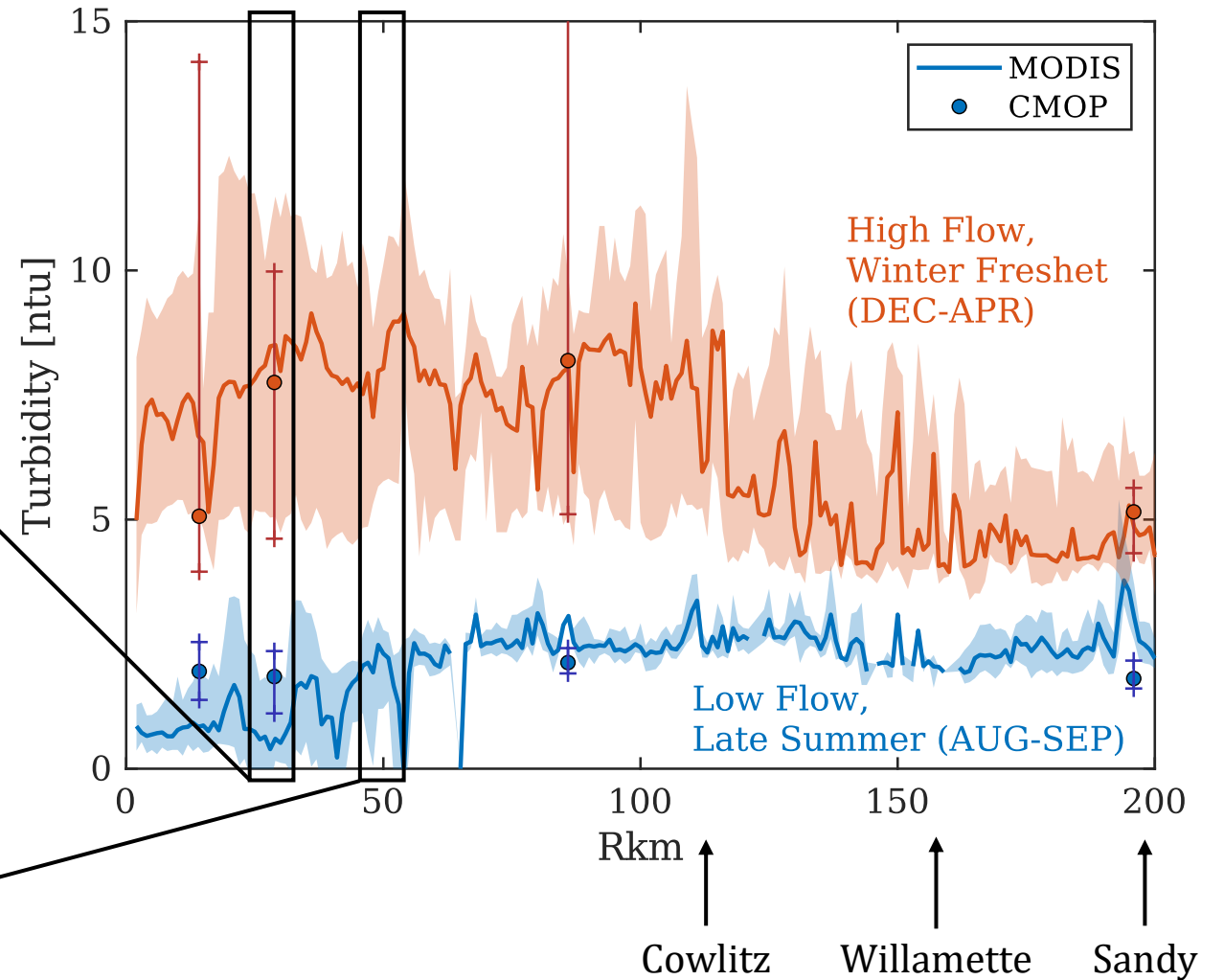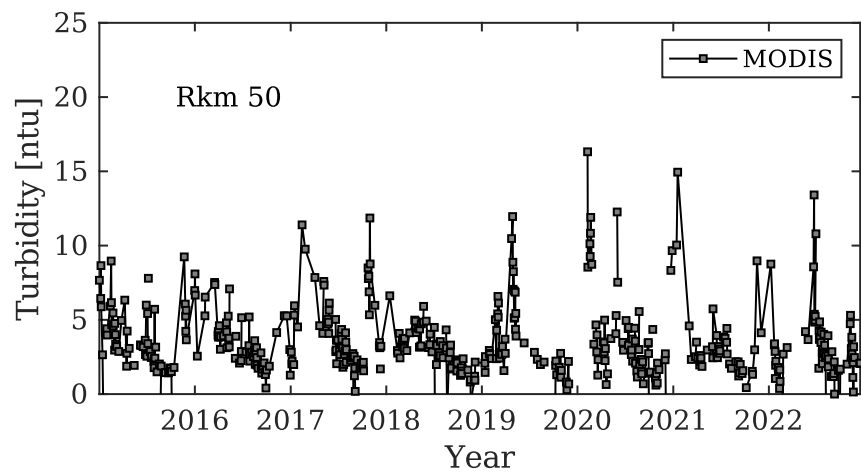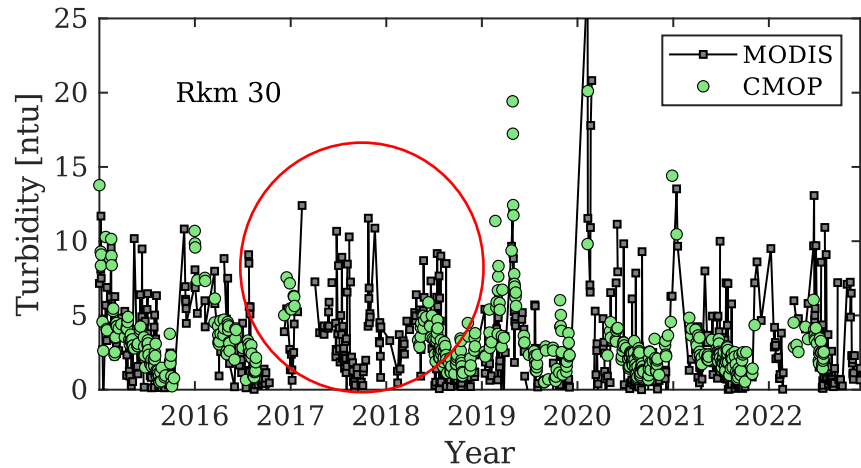between 2015 and 2022

Resolving Spatial Patterns

How does turbidity
change with river
discharge?

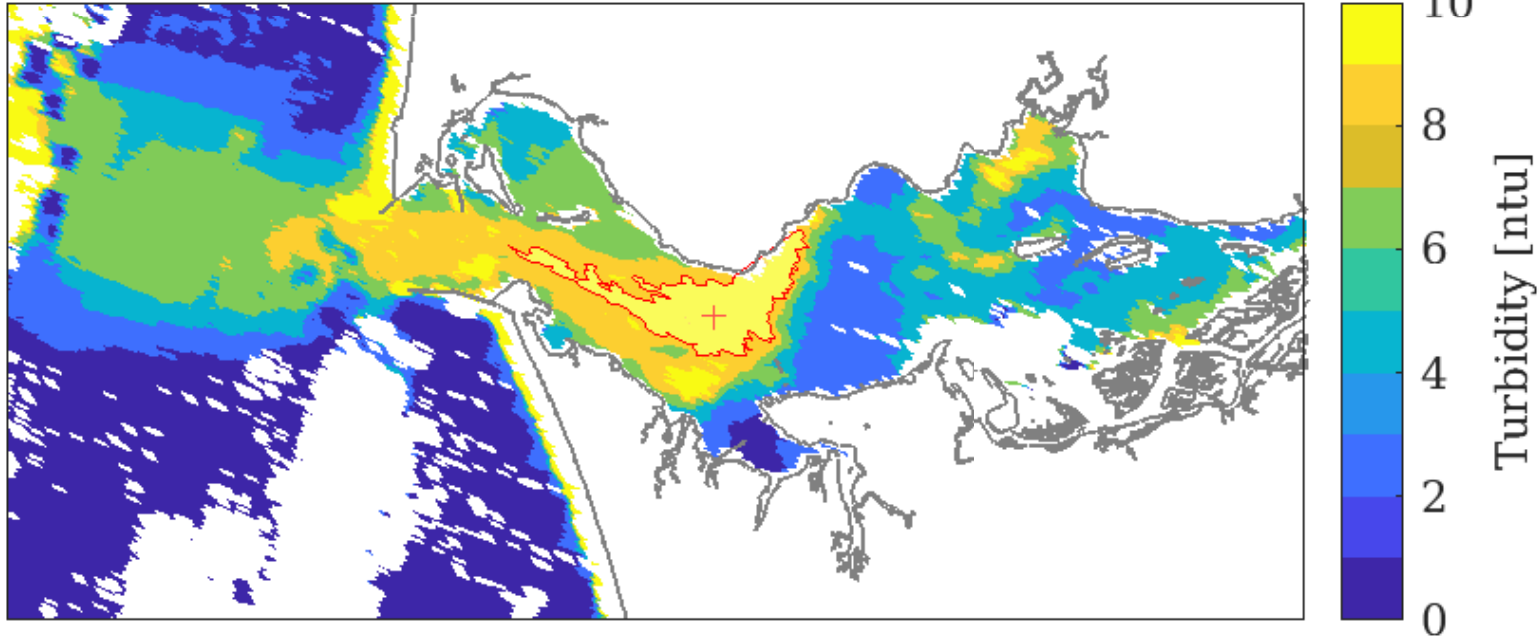Data averaged between 2015 and 2022
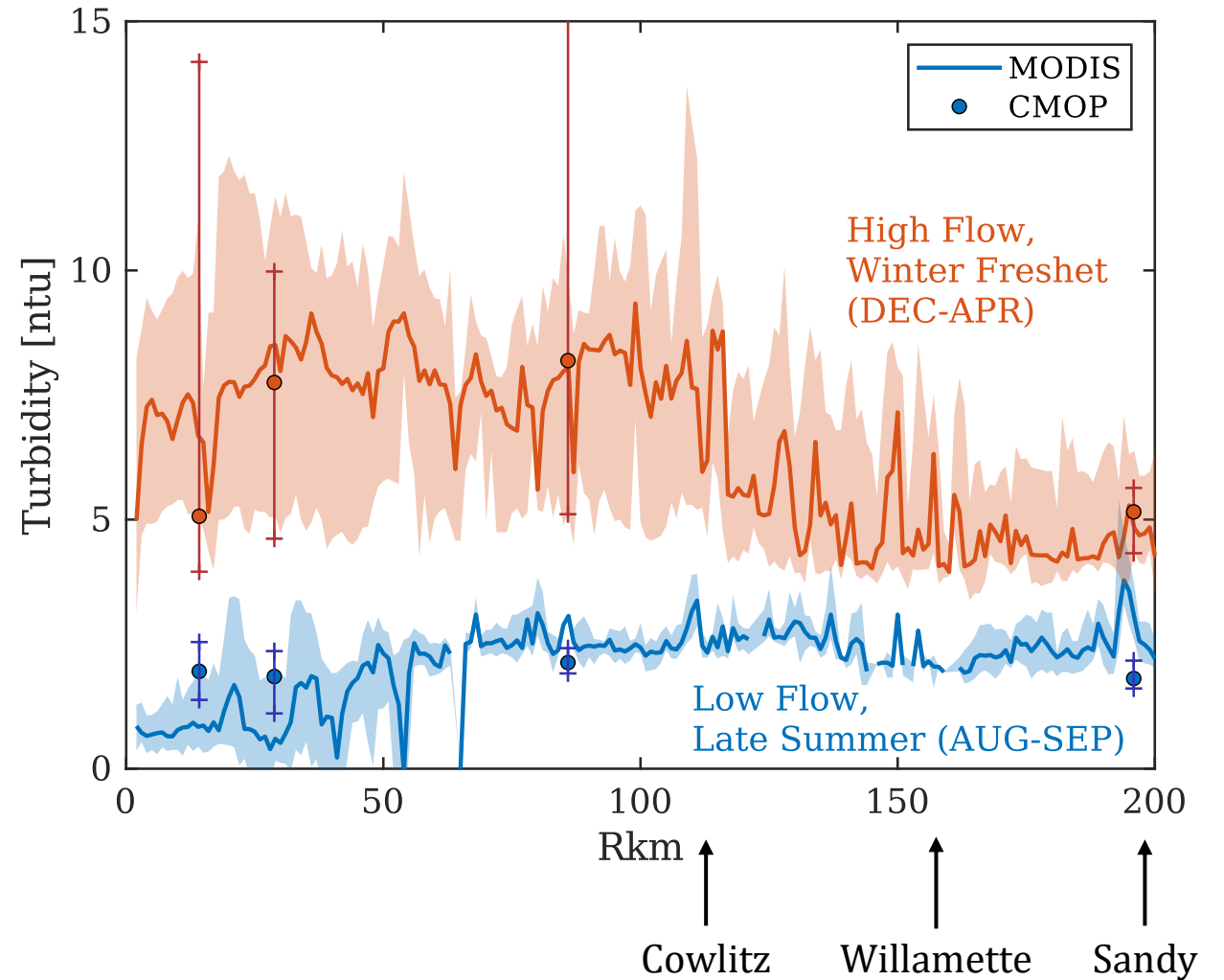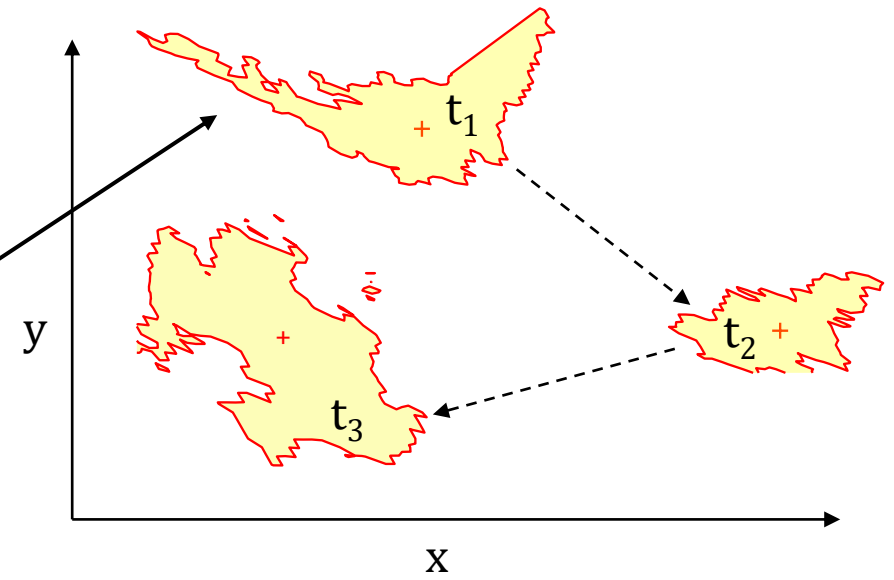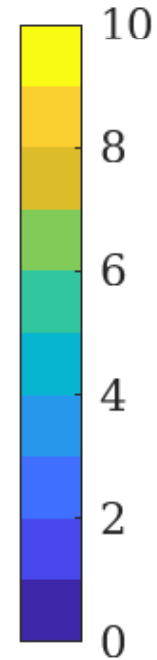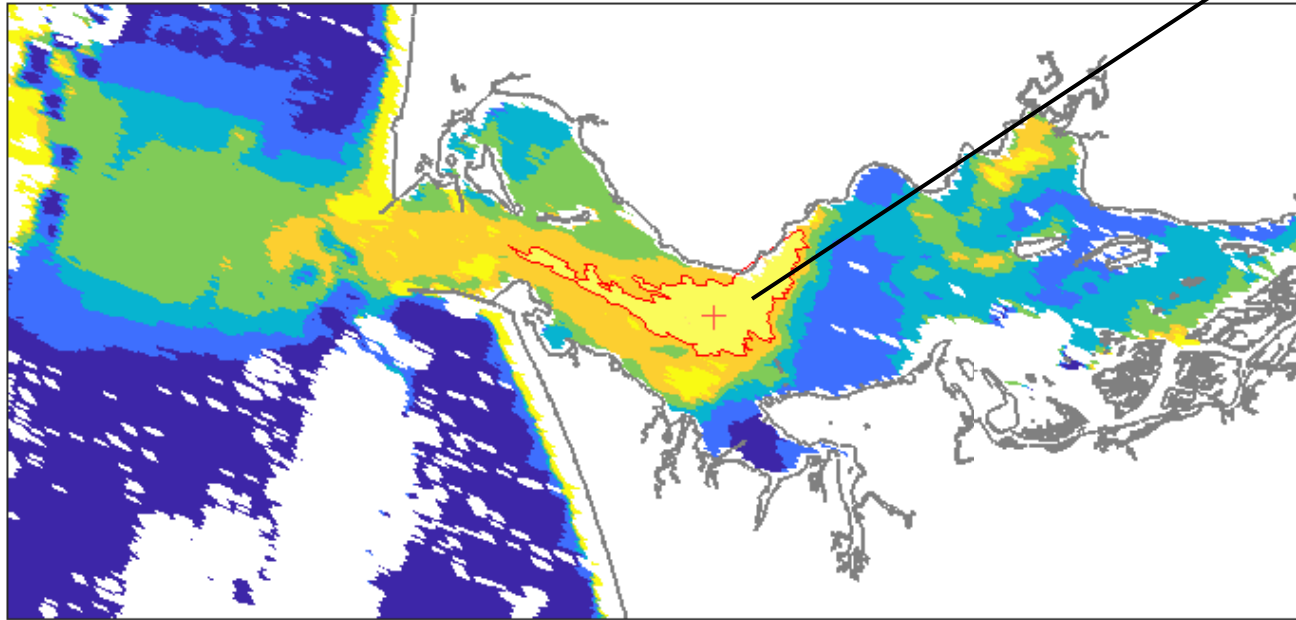
Filling Data Gaps

Pattern Recognition

12-Feb-2015 09:50:00

Pattern Recognition

12-Feb-2015 09:50:00

Don't Look Up:

Practical Methods for Incorporating Satellite Data in Monitoring Columbia River Ecosystems

Austin Hudson[1,4], **Matthew Brand[2], Heida Diefenderfer[2], Stefan Talke[3],**

David Jay[4], Will Templeton[5], Maggie Mckeon[2]

[1]Fluvial Designs & Consulting, Mosier, OR

[2]Pacific Northwest National Laboratory, Sequim, WA

[3]California Polytechnic State University, San Luis Obispo, CA

[4]Portland State University, Portland, OR

[5]Coastal Geologic Services, Bellingham, WA

Presenting author (email: fluvialdesigns@gmail.com)