



How do storm events and fair-weather conditions affect sedimentation patterns on salt marshes?

D. Tognin ¹, M. Pivato ¹,
A. D'Alpaos ² and L. Carniello ¹

¹ Department of Civil, Environmental
and Architectural Engineering,
University of Padova, Italy

² Department of Geosciences,
University of Padova, Italy

8th May 2020

- Salt marshes are worldwide affected by relative sea level rise
- Reduction of river-supplied sediment

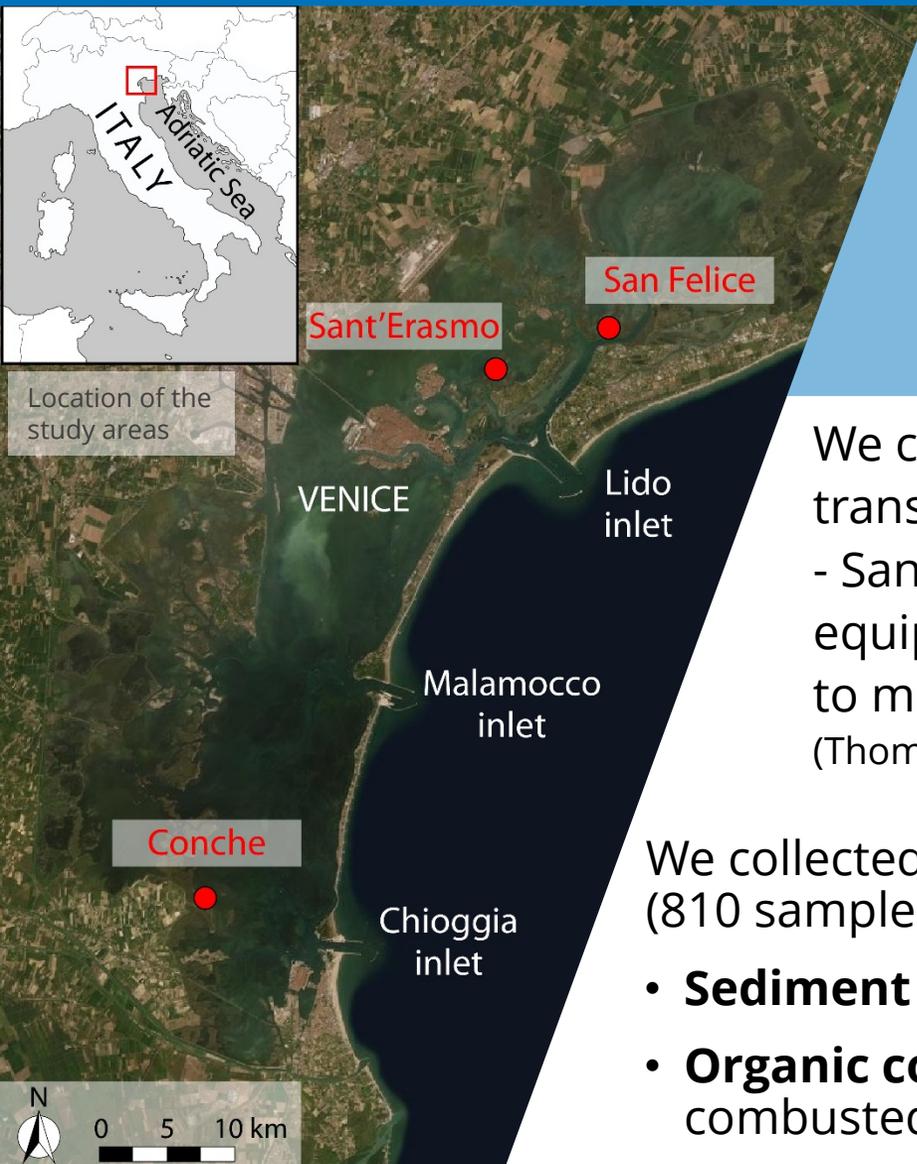


the major sediment source is represented by resuspension (tide + wind waves)

- Resuspension events are related to storms

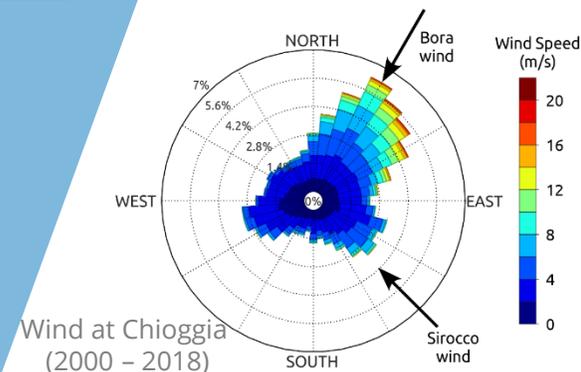
Aim: Understand how storm events and fair-weather conditions affect sedimentation on salt marshes



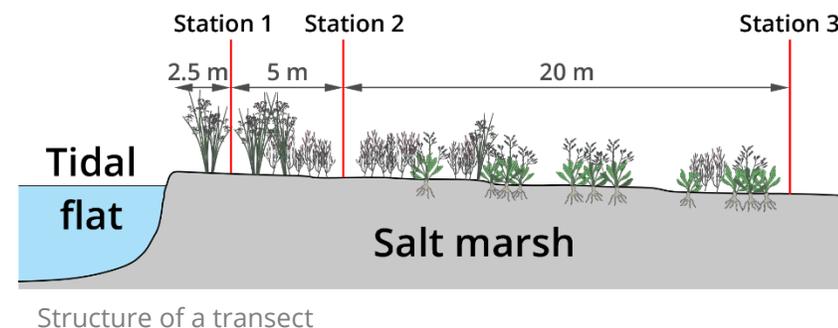


Venice lagoon, Italy

- 550 km²
- Tidal regime: semidiurnal and microtidal (1.5 m max)
- No riverine sediment input



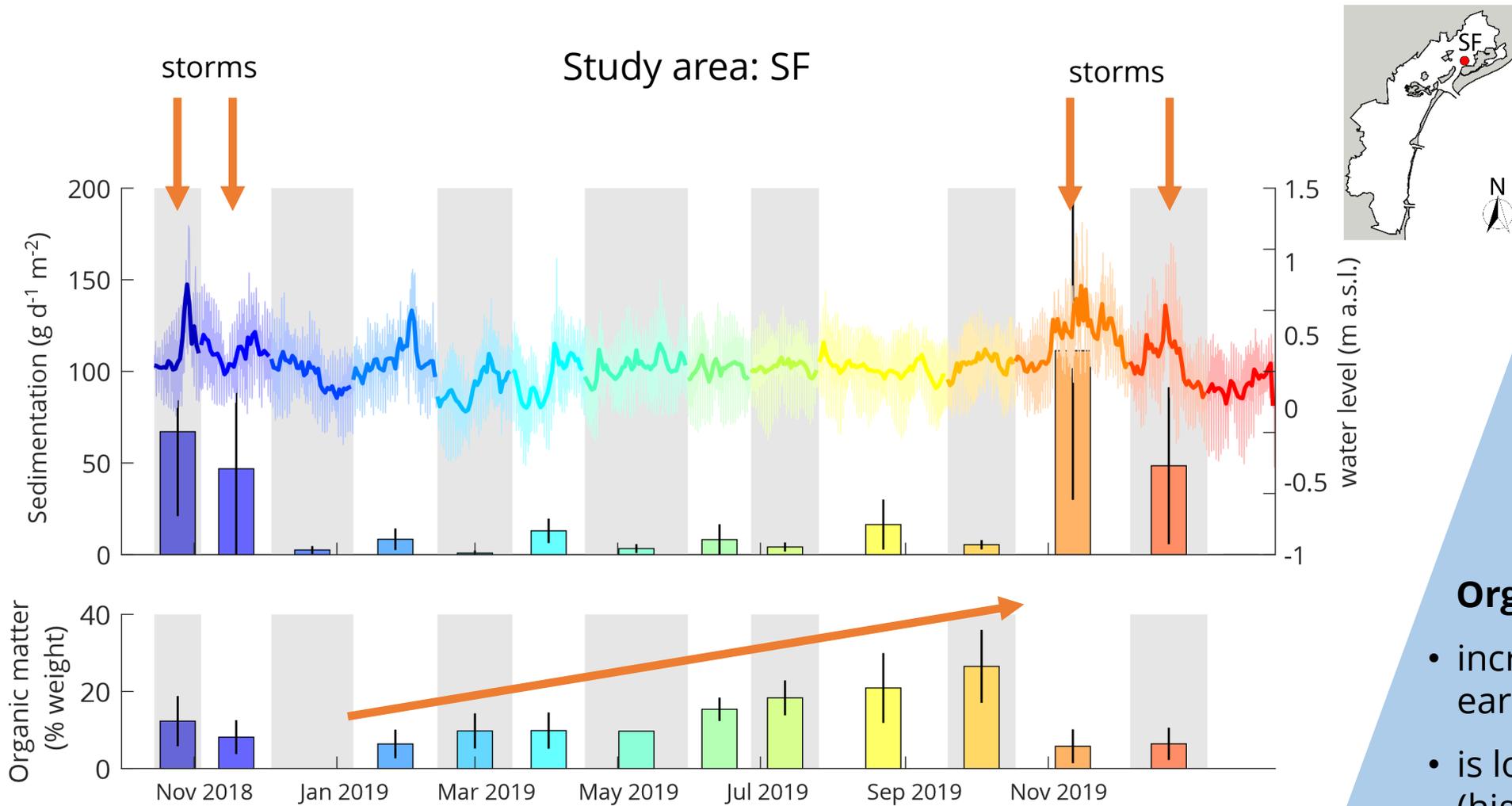
We chose 27 stations (grouped in 9 transects in 3 study areas: San Felice - Sant'Erasmus - Conche) each one equipped with 2 **sediment traps** to measure sediment accumulation (Thomas & Ridd, 2004; Nolte et al., 2013).



We collected sediment monthly or after each storm event since October 2018 (810 samples, up to now) and determined:

- **Sediment accumulation:** sediment dried at 40°C for 48 h, then weighted.
- **Organic content** with LOI (Loss On Ignition): 2 g of sediment crumbled and combusted at 375°C for 16 h (Ball, 1964; Roner et al., 2016).

How does sedimentation vary over time?



Tide gauged at each study area

Sedimentation

- increases during severe storm events (October 2018 and November 2019)
- is low during fair-weather conditions

Organic matter

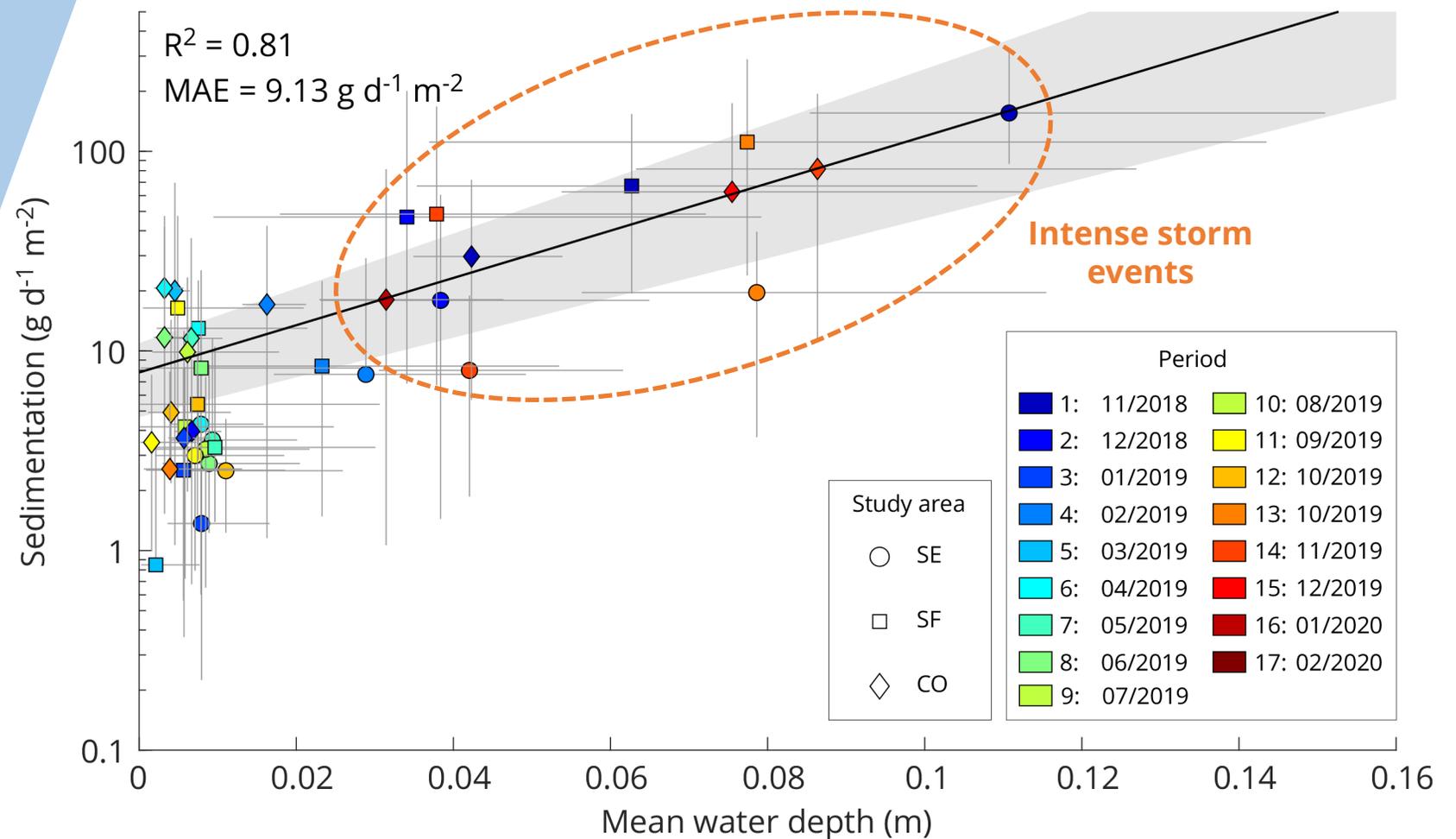
- increases during summer and early autumn
- is low during storm events (higher inorganic sediment resuspension from tidal flats)

Upper plot: thin line represents tidal level, thick line the daily mean tidal level.
Bars represent values averaged over the study area, errorbars represent the entire range of variability.

How are sedimentation and tide related?

Sedimentation exponentially increases with mean water depth over salt marsh

Intense storm events increase significantly sedimentation, resuspending inorganic material from tidal flats



Each marker represents an area, each color a different period. Errorbars represent the entire range of variability. Shaded area represent the 95% confidence interval. MAE (Mean Absolute Error) = $9.13 \text{ g d}^{-1} \text{ m}^{-2}$.