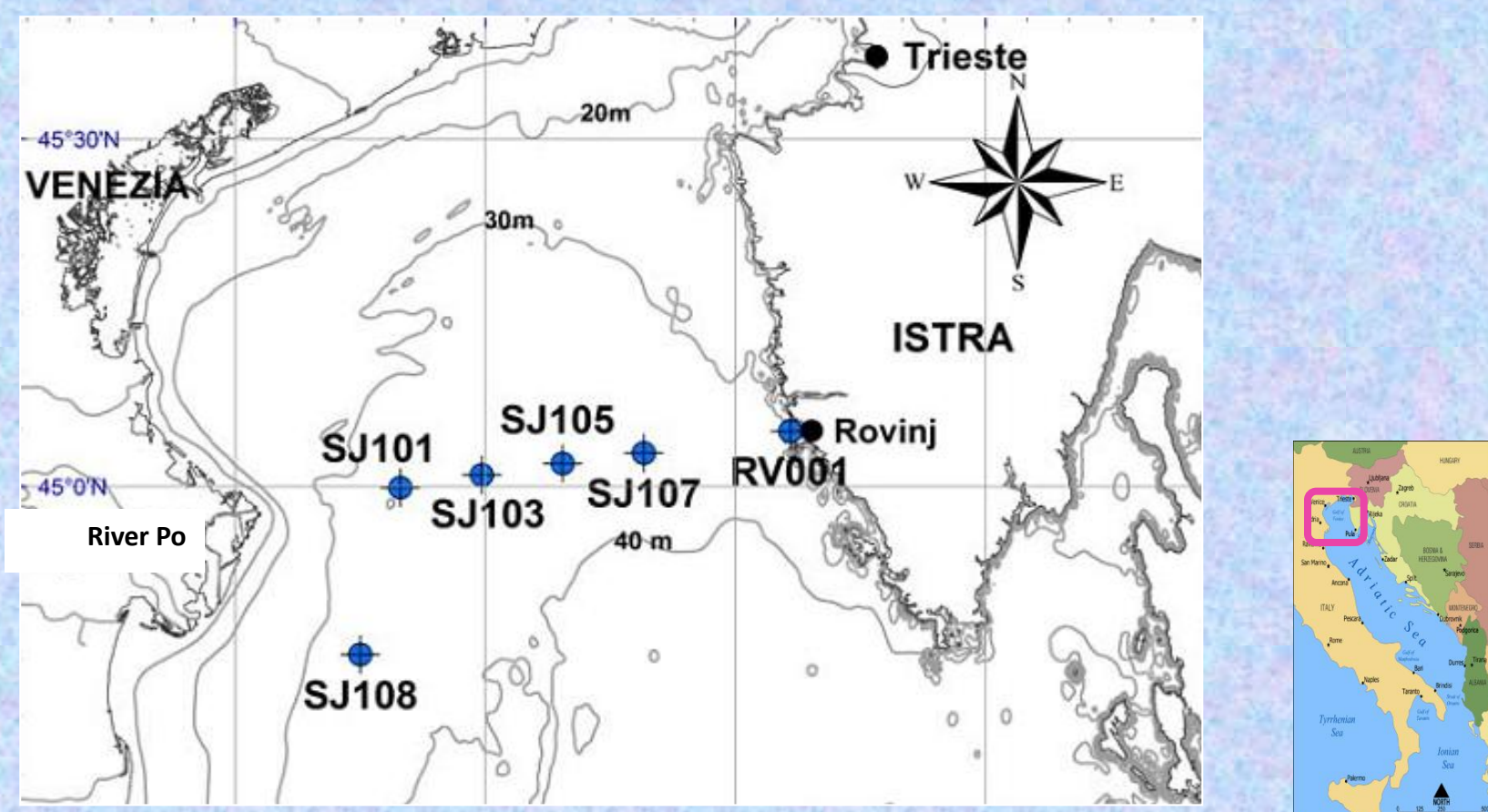


# Long-term investigations of organic matter content in the Adriatic Sea as an indication of global changes

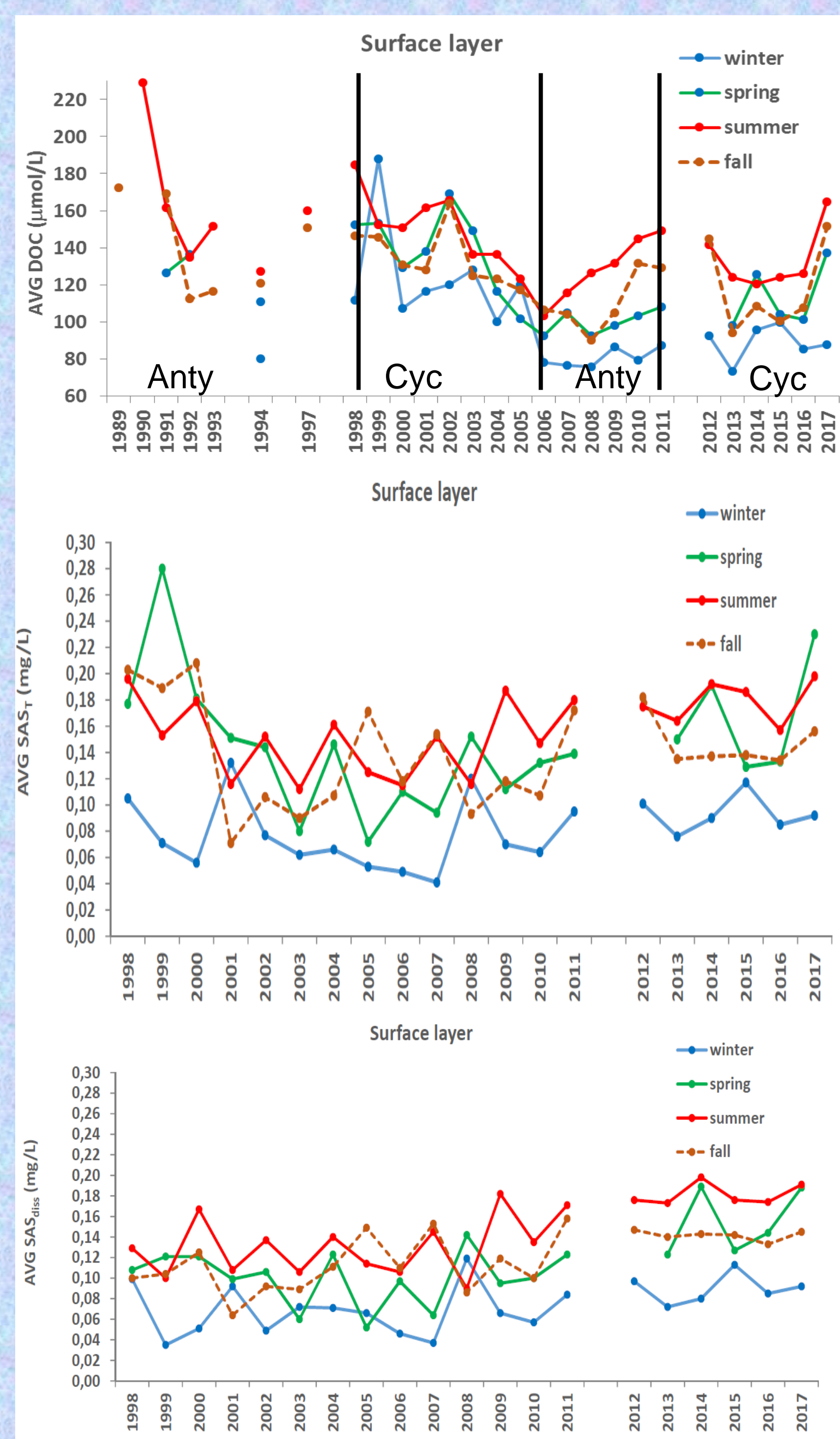
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Time series of seasonal DOC, SAS<sub>NF</sub> and SAS<sub>F</sub> values over the northern Adriatic transect in surface layer



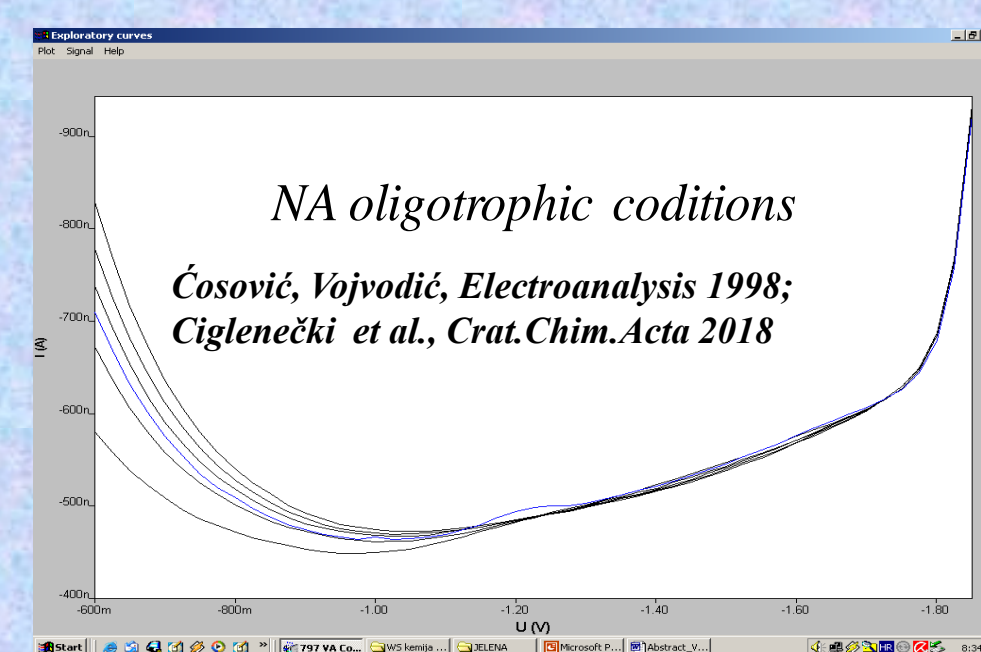
## Study area

The northern Adriatic (NA) is the most investigated and the most productive (occasionally eutrophic) part of generally oligotrophic Mediterranean.

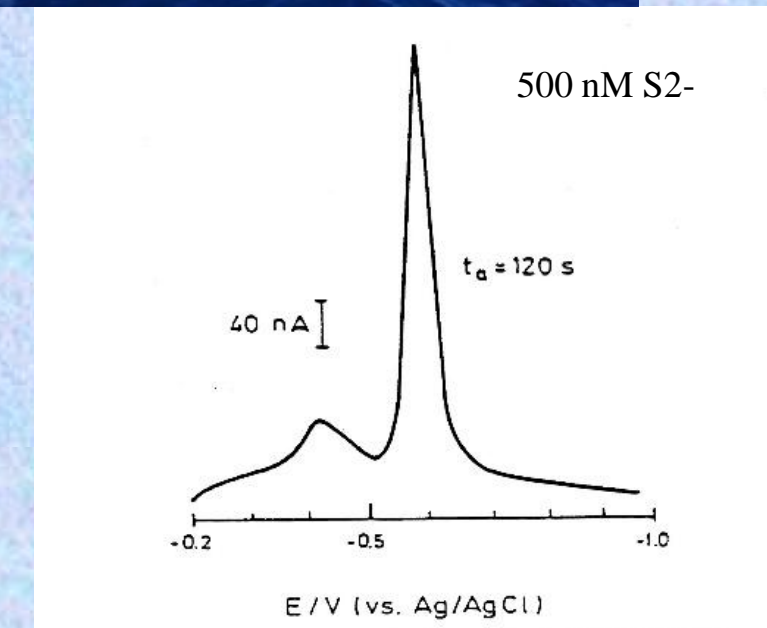
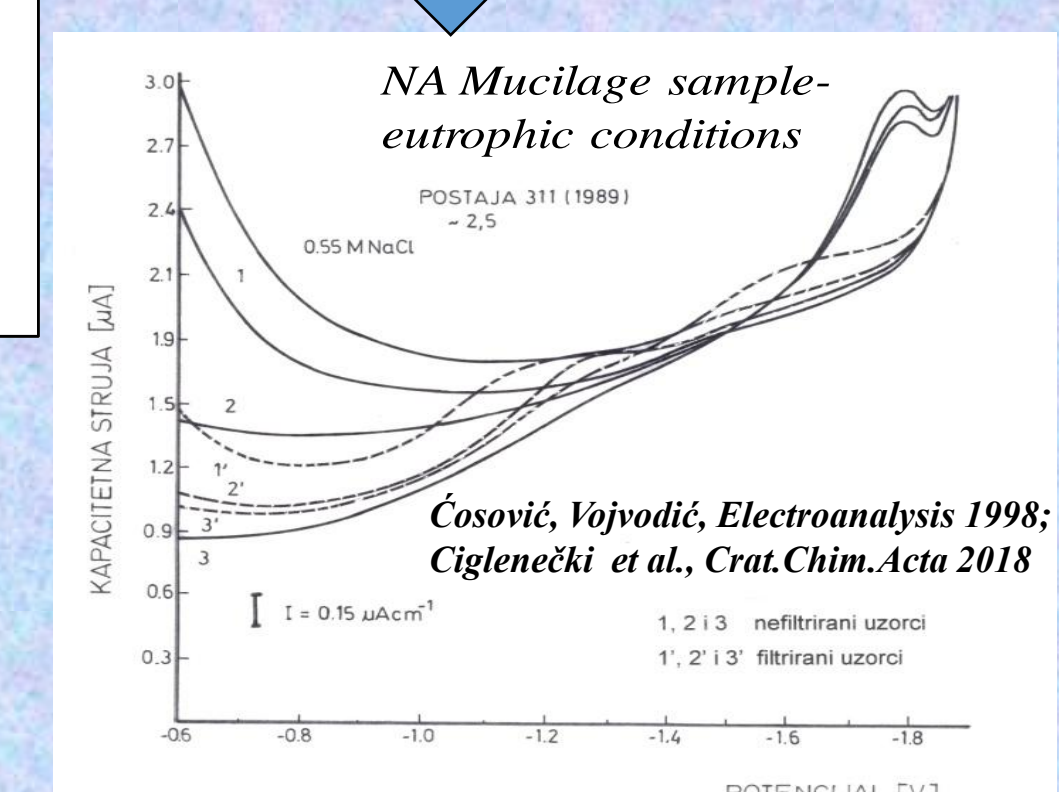
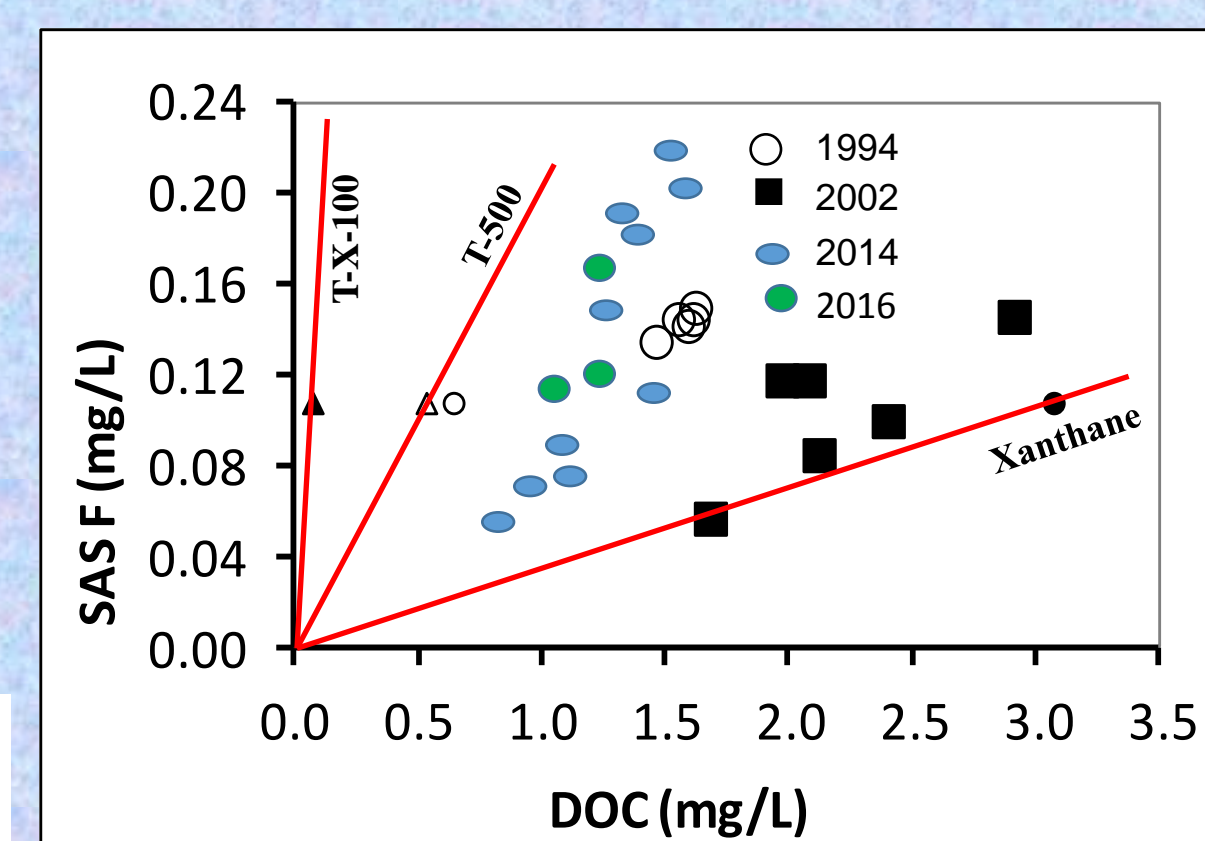
## Results

- NA is very dynamic system with periods of high and low organic carbon content; decreasing DOC and SAS increasing trend since 1989 (Dautović et al. *Sci. Tot. Environ.* 2017)
- Maximum AVG DOC value in the summer of 1990 (high SAS) is followed by significant accumulation and frequent appearance of „mucilages” (2000-2004) that reflected on high DOC
- Lowest AVG DOC value in 2006 (extremely low Po flux) is followed by an increasing trend in the period 2006-2011- anticyclonic BiOS circulation
- 2012-2016 – relatively low OM content with different SAS properties – more hydrophobic material
- 2017- increase of DOC; BiOS circulation is changing to anticyclonic

Organic matter (OM) characterization by a.c. voltametry (out of phase) SAS – DOC ratio as indication of OM reactivity



SAS/DOC values in surface seawater samples collected at stations 107 and 108



Reduced sulfur species (RSS) in mucilage samples

Ciglencečki et al., *Mar Chem* 2000, *Mar Ecol. Prog. Ser* 2003  
 Ciglencečki et al., *Crat. Chim. Acta* 2018

## Methodology

High-temperature catalytic oxidation with Pt/Si as a catalyst and non-dispersive infrared detection is used to analyse dissolved organic carbon, DOC (TOC-V<sub>CPH</sub>, Shimadzu, Japan). The method is highly sensitive (<1%RSD), enabling detection of temporal and spatial variability of DOC content in the sea.

SAS measurements were performed by a.c. voltammetry (Čosović, Vojvodić, *Electroanalysis* 1998)

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## CONCLUSION

- Significant changes in DOC, SAS can be recognized as a possible indicator of biogeochemical and climate induced variabilities (strongly influenced by local and global (climate) processes – changes
- Factors influencing the distribution and properties of OM in NA:
  - hydrographic conditions (mainly river Po) and water masses circulation driven by BiOS, i.e. inflow of different water masses from the Ionian sea
  - BiOS is responsible for advection of either highly saline ultraoligotrophic Levantine Intermediate Water from the Eastern Mediterranean (cyclonic circulation) or nutrient richer less saline Western Mediterranean waters (anticyclonic circulation), that highly influence OM content and properties
  - changes in OM conc. and properties are direct consequence of biological, mainly phytoplankton activities, and changes in its abundance and community compositions
  - (Totti et al., *J. Mar. Syst.* 2019) found and enrichment of dinoflagellates, with intensive blooms of *Noctiluca scintillans* in the northwestern NA (2007-2016); dinoflagellates contribute to higher SAS values