LONG TERM STUDY OF ORGANIC MATTER FLUCTUATION AND MUCILAGE EVENTS IN THE NORTHERN ADRIATIC

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Abstract
In the last fifteen years in the northern Adriatic the massive formation of organic aggregates reported as "mucilage phenomenon" occurred with increased frequency. The intensity of this phenomenon varied over the years: (1988, 1991, 1997, 2000-2004) > 1998, 1999. In the period 1998-2008 we have studied seasonal and spatial distribution of the content of dissolved organic carbon, and concentrations of the reactive organic matter with surface active properties.
Keywords: Adriatic Sea, Organic Matter

Introduction
Most hypothesis proposed to explain the mucilage occurrence in the northern Adriatic (NA) recognize the accumulation of dissolved organic matter during the period of stratification as the main precursor of mucilage accumulation [1, 2]. We have undertaken the long-term study in order to see if the problems connected to the harmful mucilage events in NA are becoming worse or better.

Metodology
Dissolved organic carbon (DOC) and surface active substances (SAS) were analysed in the samples collected from the depth of 0.5 m along the transect between Rovinj and mouth of the River Po. SAS were determined by electrochemical method (a.c. polarography) using the calibration curve of model nonionic SAS, Triton-X-100 [3]. DOC was determined by using high temperature catalytic oxidation (HTCO) method.

Results
Over the whole period of investigations the concentrations of DOC and SAS showed regular seasonal patterns, with lower values in winter and higher values in the period from spring to autumn. A marked interanual variability of DOC and SAS values was observed as well. The mean concentrations of DOC (1.07-2.76 mg/L) obtained in the period 1998-2004, which is characterised by mucilage appearance), were up to 40% higher in comparison to the values obtained in 1994 and over the years 2005-2008 (0.82-1.60 mg/L) (Figs. 1a, 1b). No mucilage events were observed in this later period. Interestingly, the same trend of fluctuation was detected for SAS values, which were more than two times higher during mucilage appearance than those observed in the period 2005-2007 (0.025-0.405 mg/L and 0.006-0.151 mg/L respectively) (Figs.1c,1d).

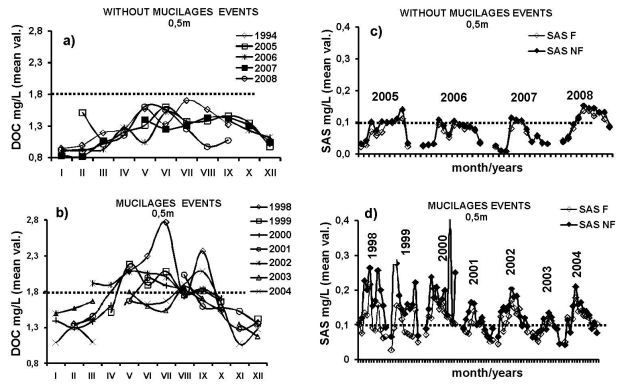

Fig. 1. Fluctuation of DOC (mean values) in the period **a)** 1994, 2005-2008 (without mucilage occurrence), **b)** 1998-2004 with mucilage events as well as fluctuation of SAS (mean values) during **c)** 1994, 2005-2008, **d)** 1998-2004

Conclusion
The seasonal distribution pattern of DOC over the whole period of investigation clearly showed a decreasing trend from 1998 to 2008, in particular after 2002 (Fig. 2). The same decreasing trend, but less pronounced was detected two years earlier (2000) for reactive surface active organic matter (Figs 1c,1d). Reduced content of SAS, as well as the absence of the greater accumulation of dissolved organic carbon in recent years, probably have an important role on disappearance of mucilage events contributing to the improvement of the northern Adriatic Sea ecosystem.

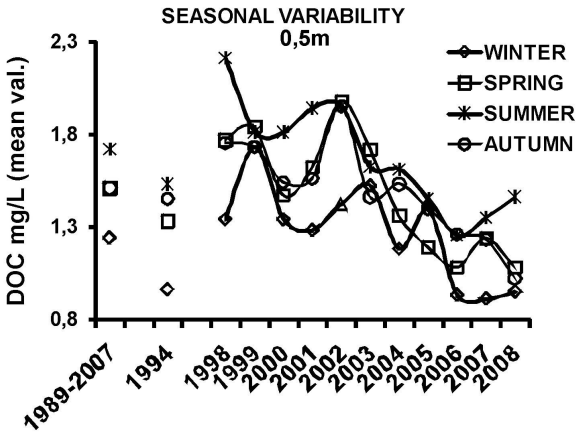

Fig. 2. Seasonal fluctuation of DOC (mean values) in period 1998-2008

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