CADEAU project[1]

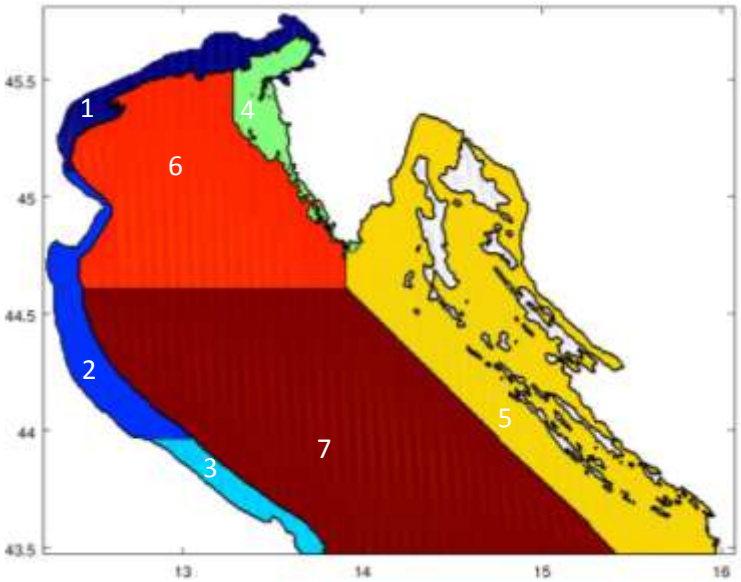
2018 Bulletin on the environmental state of the North Adriatic Sea

Introduction

CADEAU is a downstream coastal service devoted to operationally deliver products to quantify nutrient dynamics, eutrophication and bathing water quality in coastal areas in support of the application of the EU Directives relative to coastal and marine environment (WFD, UWWTD, BWD,MSFD) derived. In particular, the products are designed to give information for North Adriatic region on the space-time distribution of major parameters related to water quality (nitrogen
and phosphorus concentration, chlorophyll, dissolved oxygen), with an emphasis on the coastal area close to the town of Chioggia (Venice). The forcing conditions are provided by the Coperniucs Marine Service (CMEMS) and COSMO-LAMI model (ARPAE-SIMC, the HydroMeteorological Service of the Emilia-Romagna Regional Agency for Environmental Protection), the model also assimilates in situ water quality data from the SoE EIONET network (http://www.sintai.isprambiente.it/faces/public/SOE/index.xhtml).

Bulletin geographic coverage

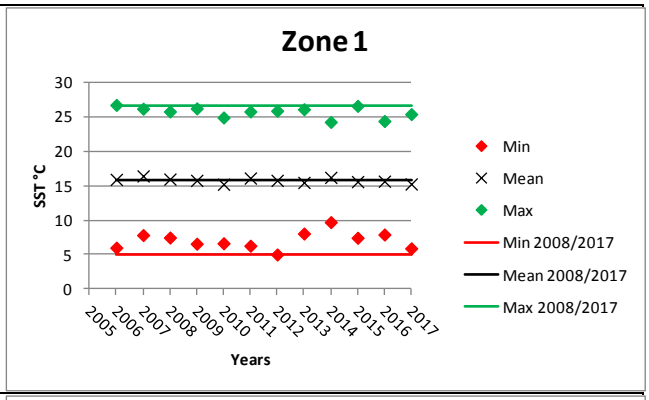
Figure 1 shows the area covered by CADEAU products. In particular the whole domain is split into 7 different zones to differentiate the reporting into homogeneous portions of Sea. Zones 1, 2, 3, 4 and 5 represent coastal areas, while 6 and 7 are off-shore areas.

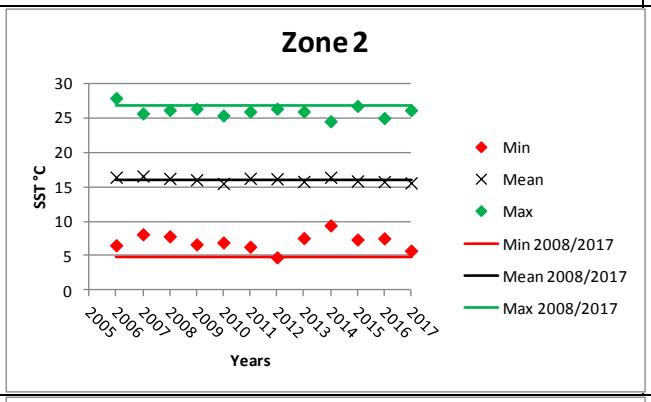


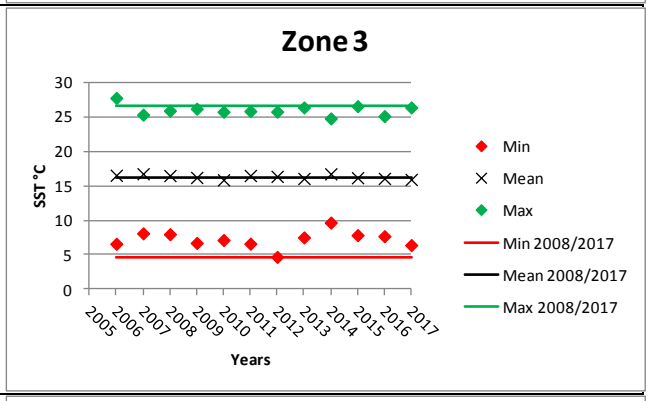
[1] Data "Generated using E.U. Copernicus Marine Service Information".
http://www.bio.isprambiente.it/cadeau/index.html
cadeau@isprambiente.it

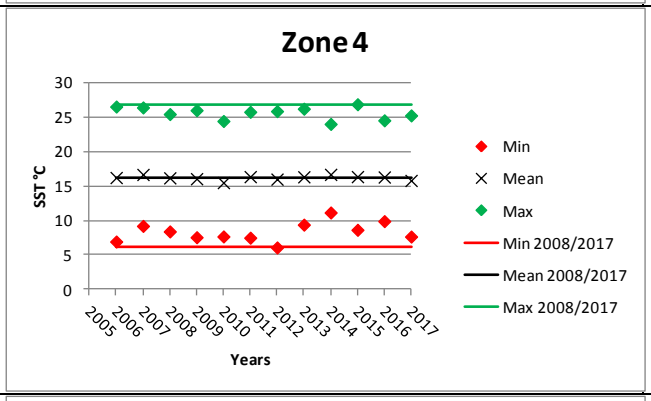
Sea Surface Temperature

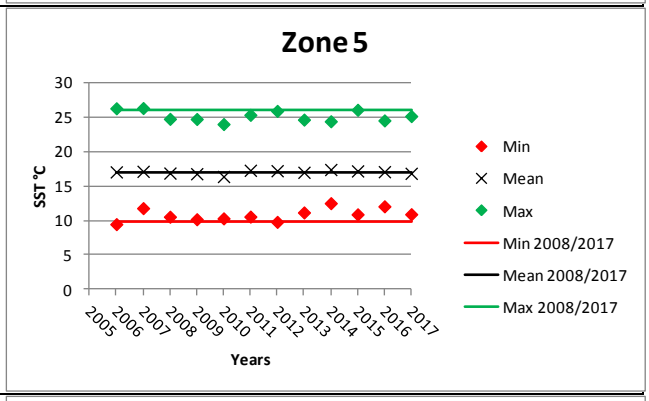
The 10 years minima show that the SST is a little bit colder in the Italian coastal zones (1, 2 and 3) with the south-eastern zones being the warmest. The mean yearly temperature is almost stable in all the zones with small deviations from the ten years trend. 10 years maxima are really similar (a little bit lower in zone 5). Last year data (2017) show a lower mean value in all the zones with respect to the 10 years value.

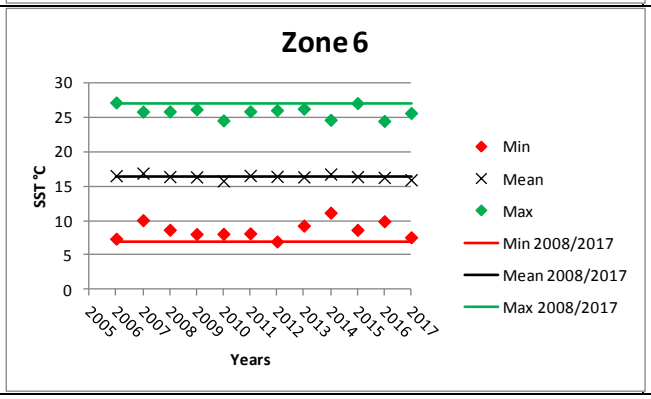


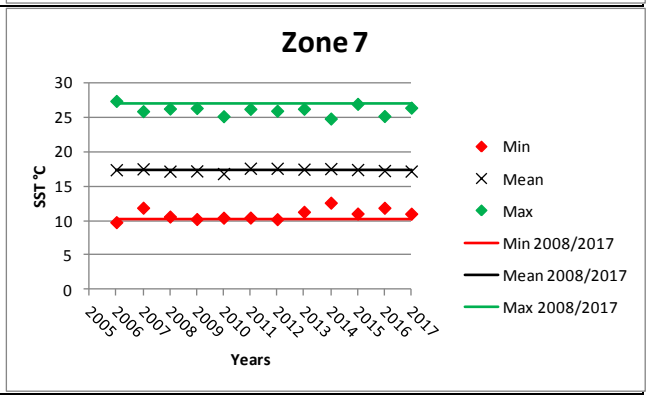






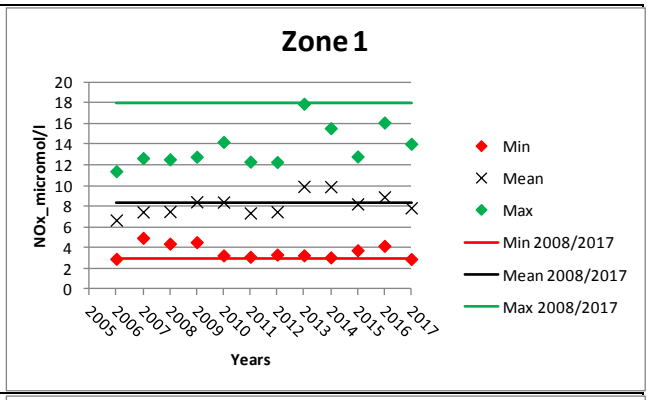


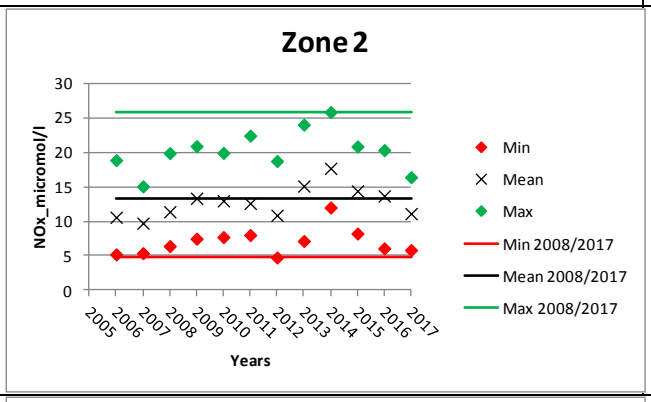


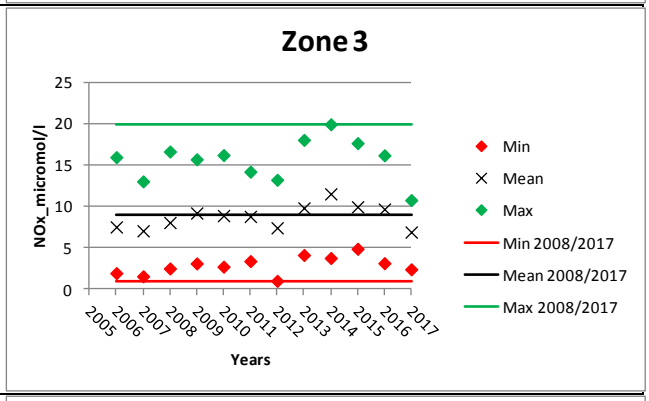


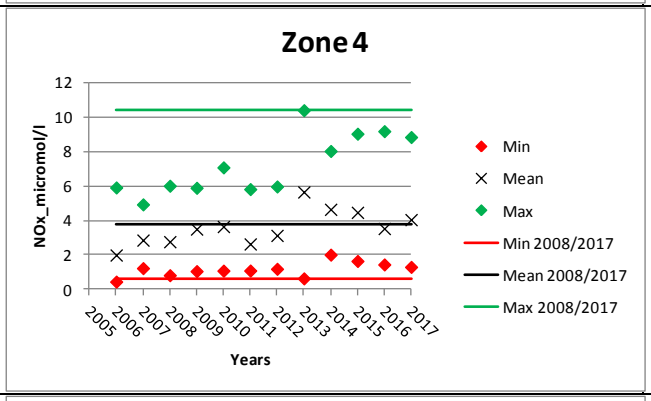
Nitrogen Oxides (NOx)

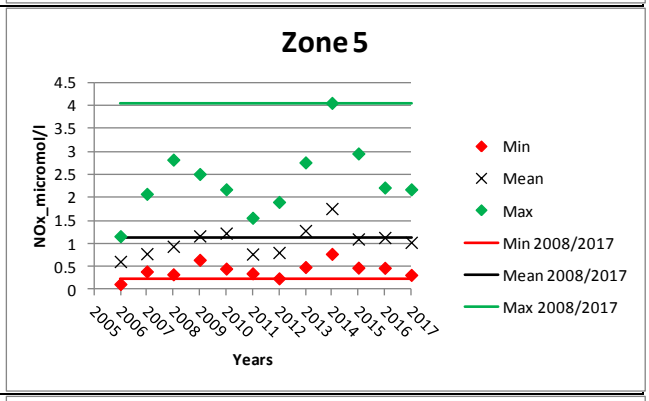
10 years minima, maxima and averages show a great variability in the different zones of the computational domain. Zone 2 shows the highest minimum, average and maximum. Last year data compared to the ten years values show lower maxima and averages in all the zones.

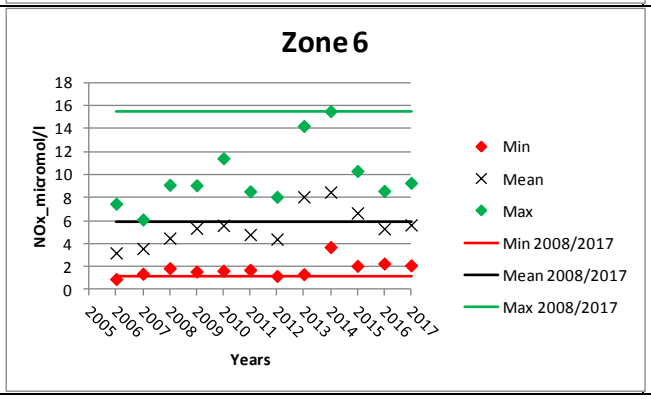


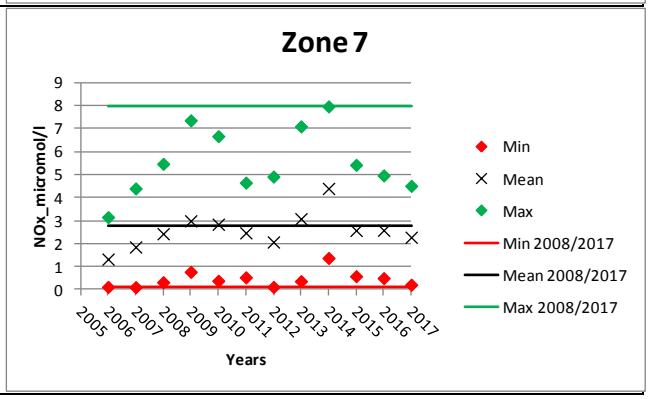






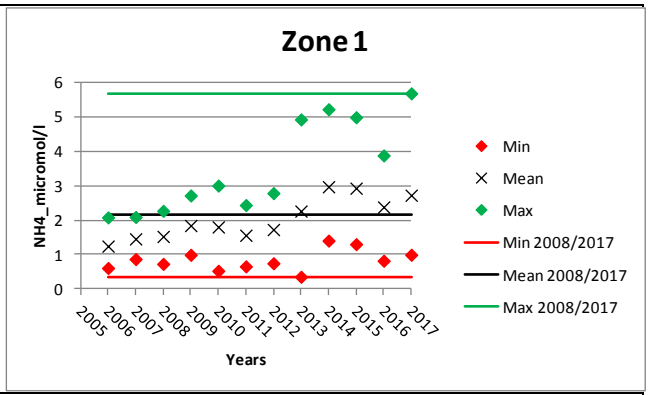


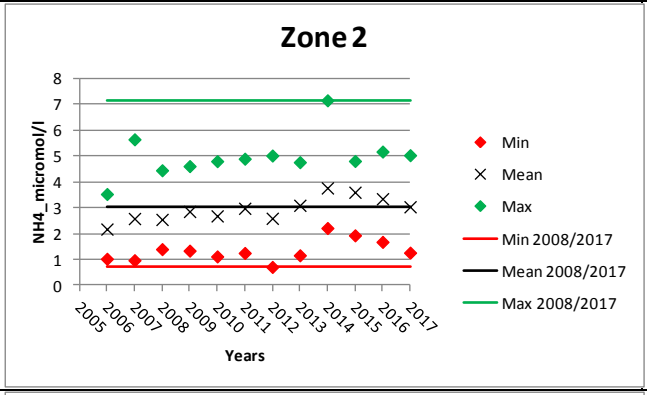


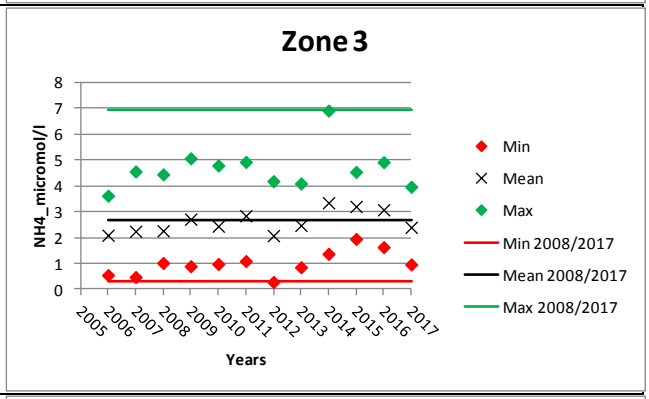


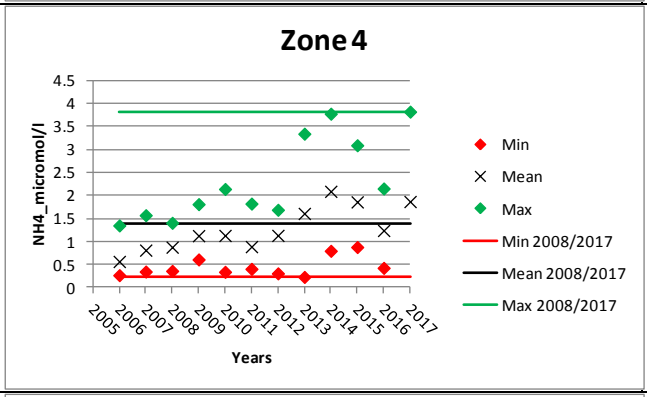
Ammonium (NH4)

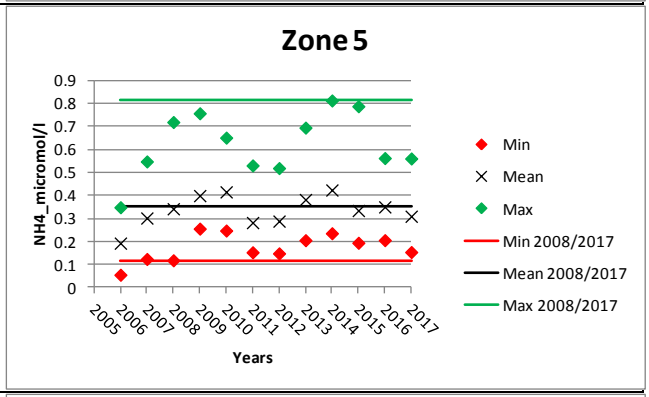
10 years values show a similar behavior for zones 2 and 3 (and zone 1), for zones 4 and 6, while zones 5 and 7 show different 10 years values from all the others. Last year data show the highest values for zones 1 and 4. Zones 2, 3, 5, 6 and 7 have maxima much lower than 10 years values. Last year's averages for zones 3, 5 and 7 are lower than the 10 years mean, while they are higher for zones 1, 4 and 6.

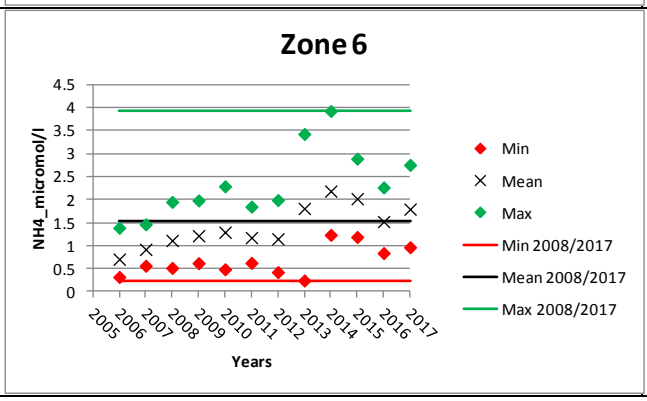


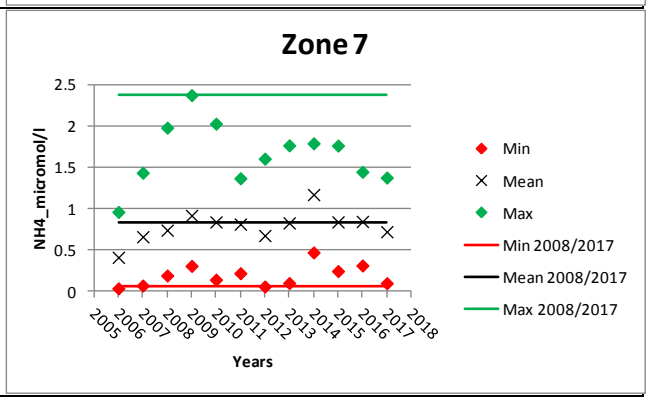






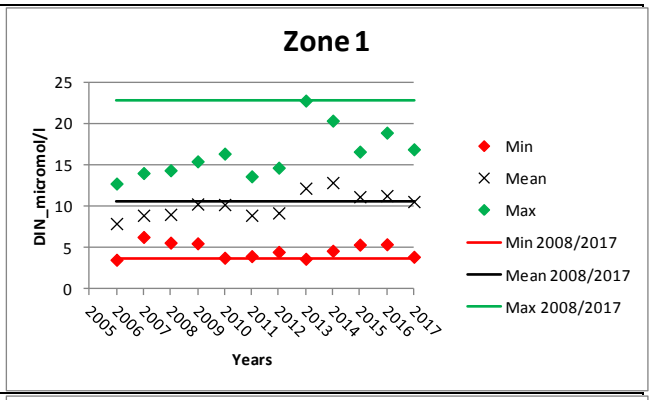


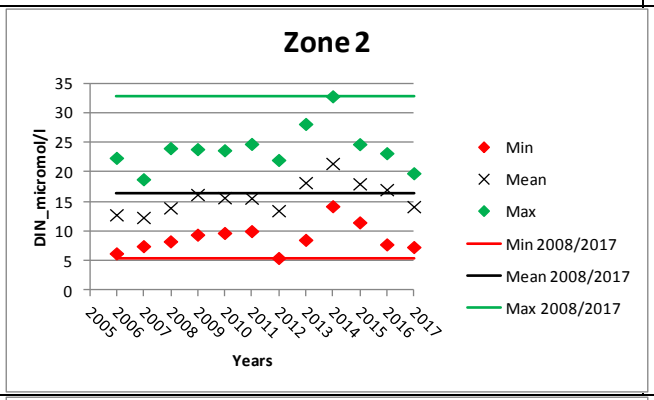


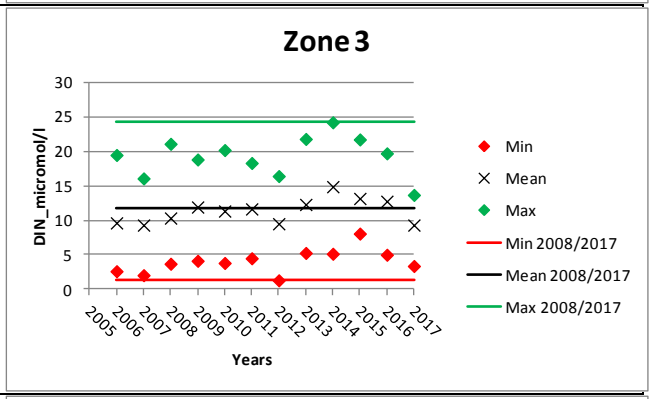


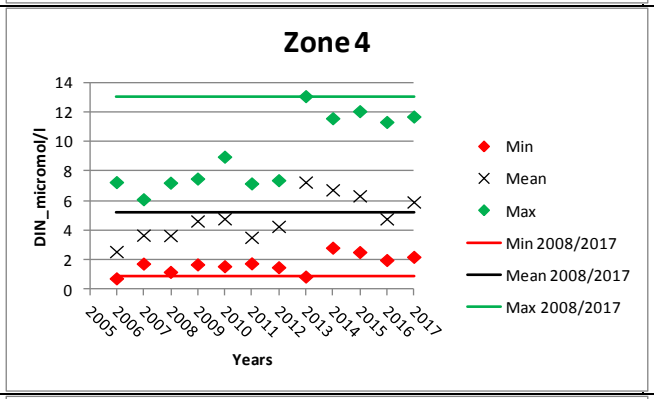
Dissolved Inorganic Nitrogen

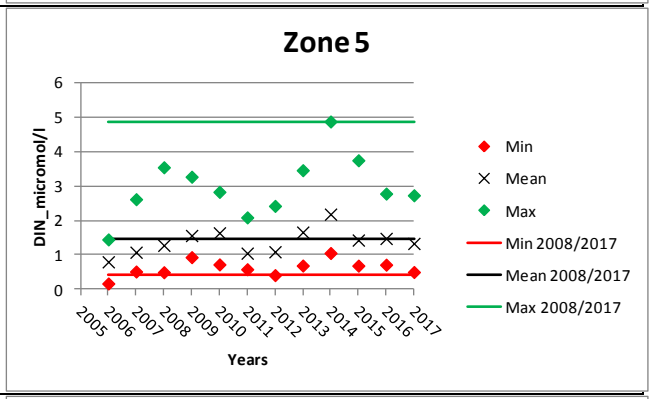
Zone 2 show the highest values of DIN, while zone 5 show the lowest ones. On the average DIN values are higher along the Italian coasts than on the Croatian ones. Last year values are on the average lower than the 10-years mean.

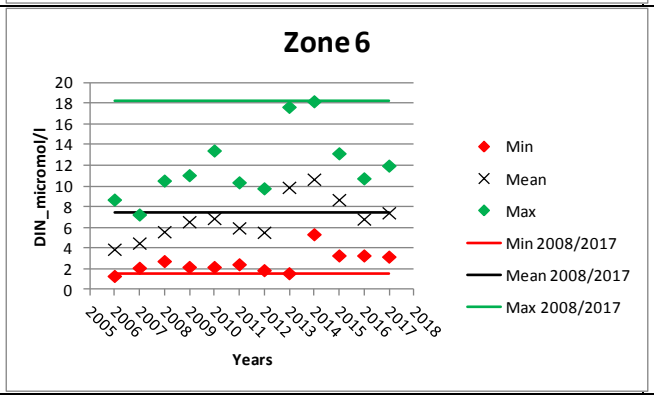


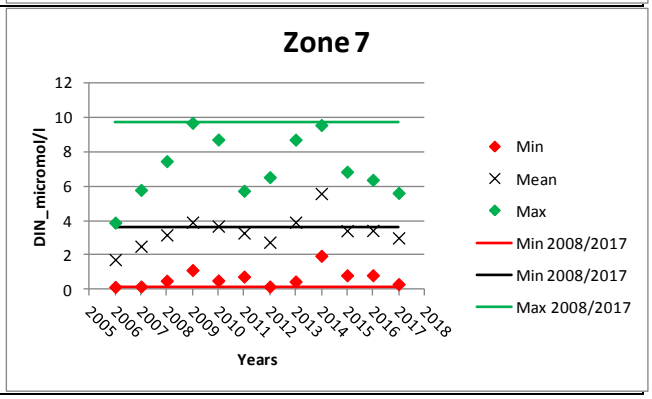






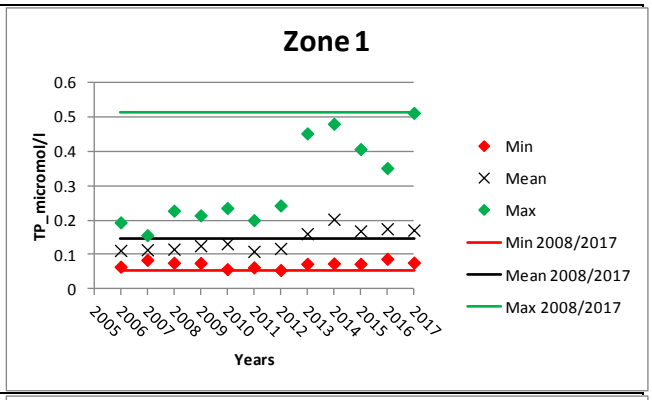


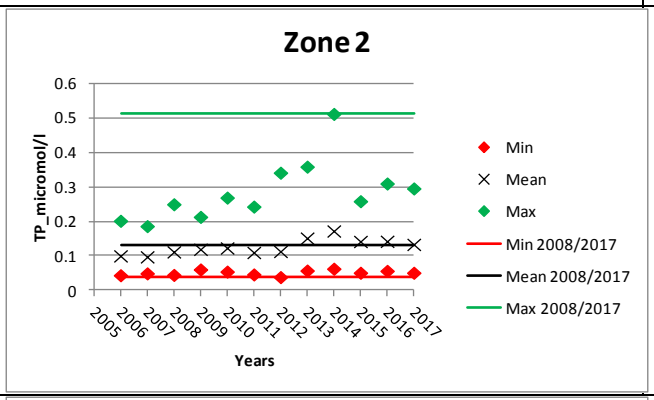


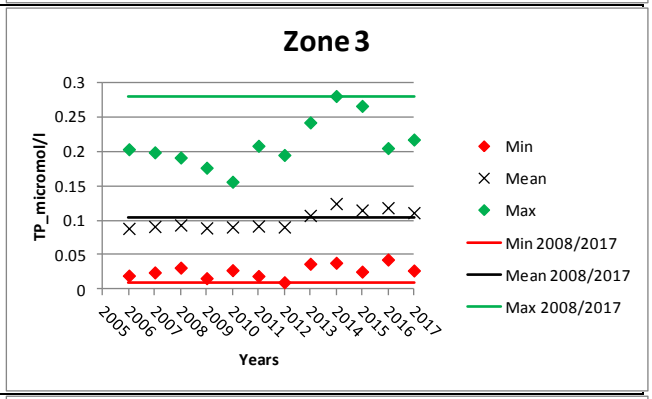


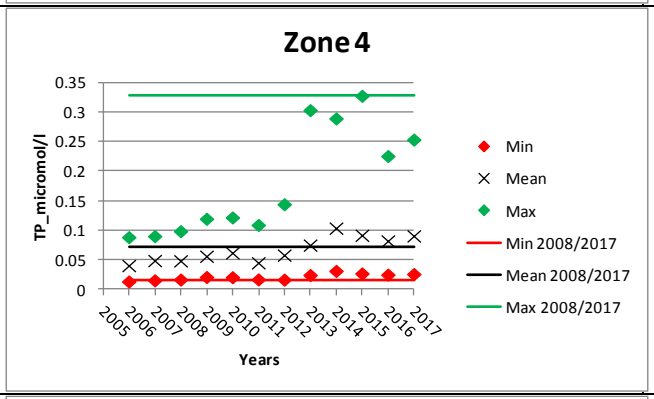
Total Phosphorus

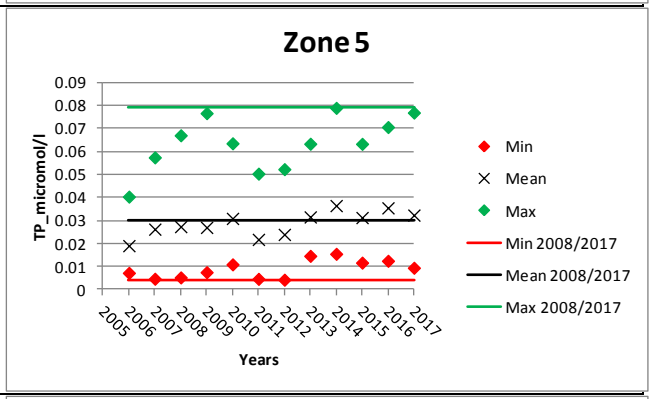
Considering the 10 years values, zones 1, 2 and 3 (Italian coasts) show the highest maxima and averages. Last year values show the 10 years maximum for zone 1.

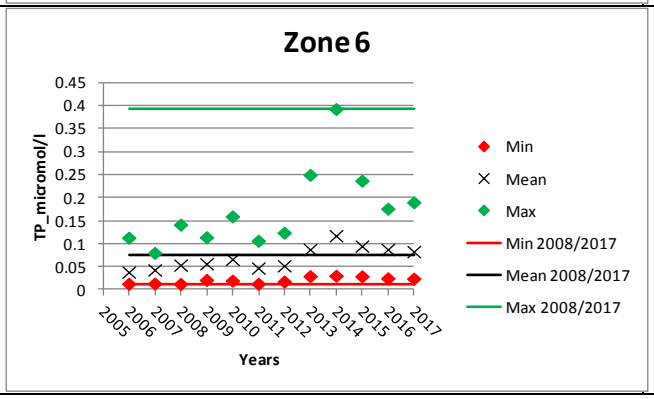


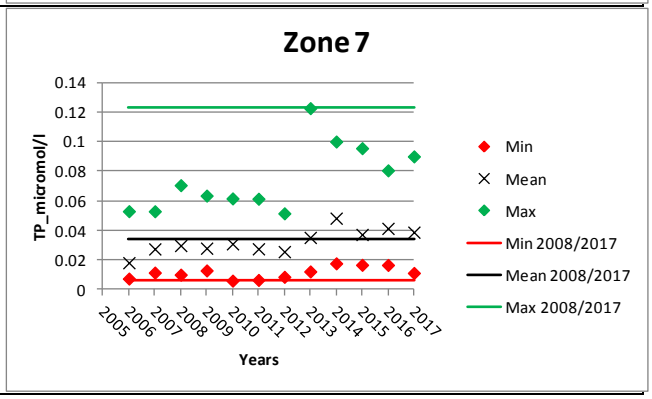






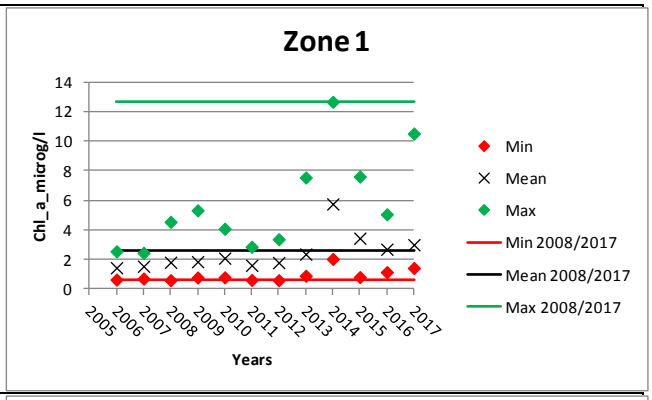


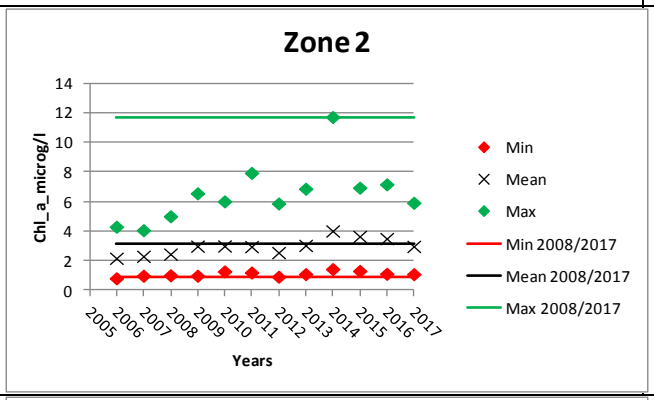


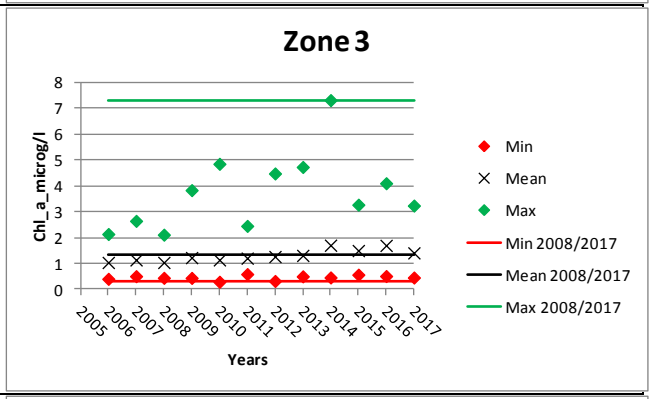


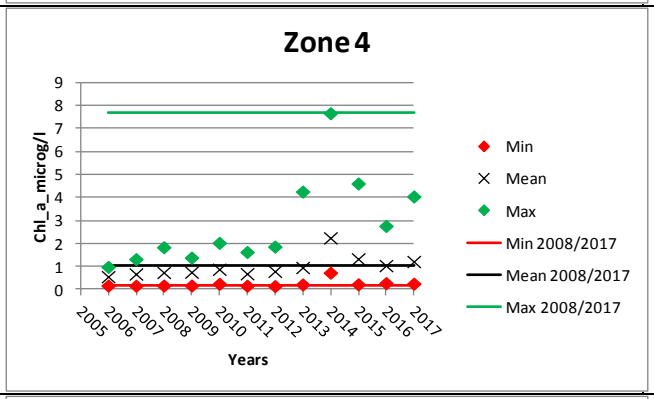
Chlorophyll *a*

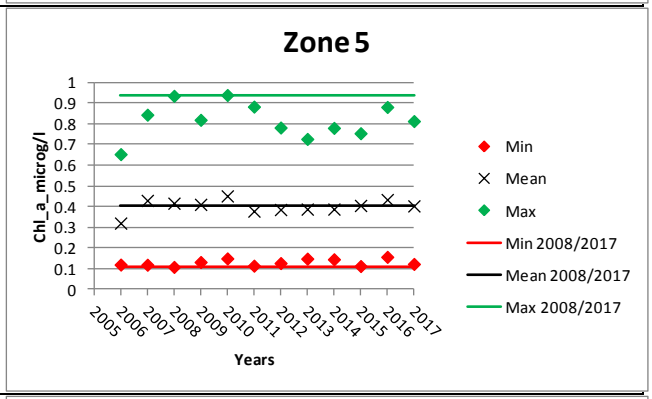
Zone 5 and 7 (in the southern part of the domain) show the lowest values in the 10 years statistics, while zones 1 and 2 show the highest ones. Last year values are on the average a little bit lower than the 10 years mean for the zones 2, 5, 6 and 7, while theay are a little bit higher for zones 1, 3 and 4..

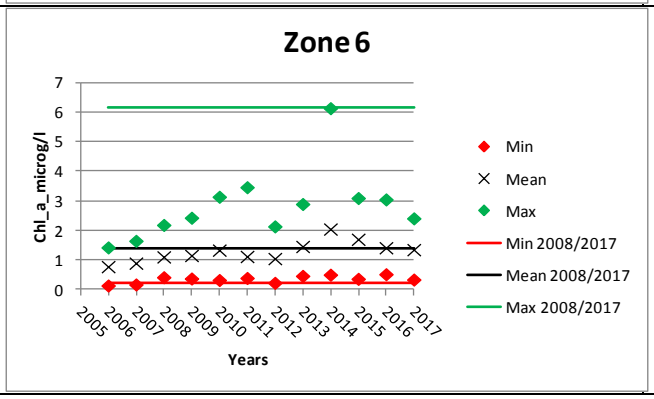


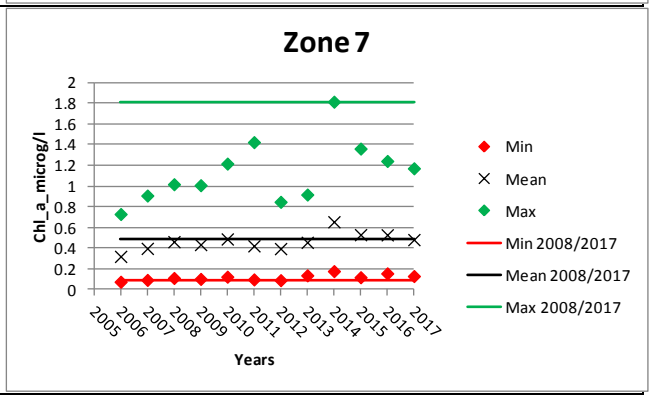






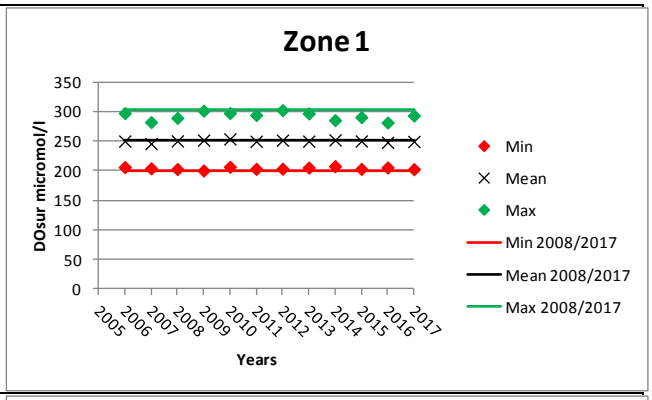


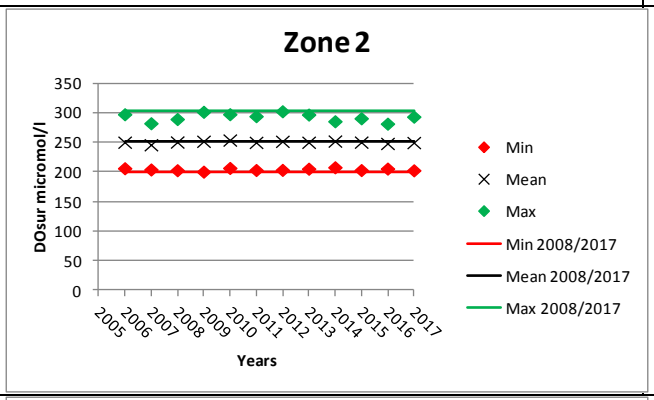


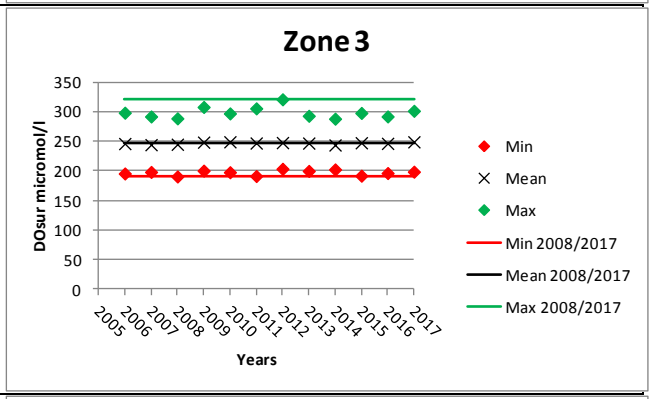


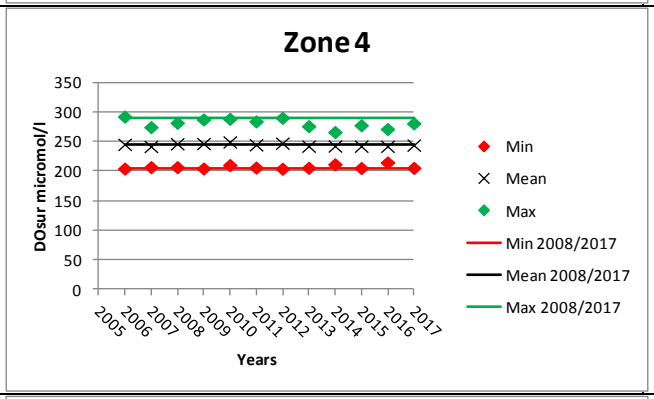
Surface Dissolved Oxygen

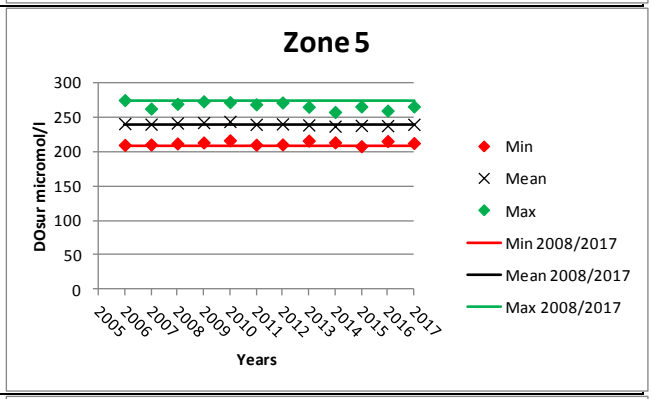
Dissolved Oxygen on the sea surface show a similar behavior for zones 1 and 2. Generally speaking average values are very stable for all the zones. Last year values do not show any peculiar behavior with respect to the previous years.

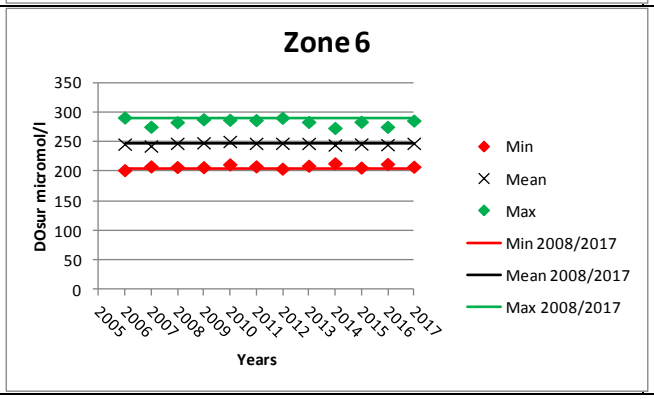


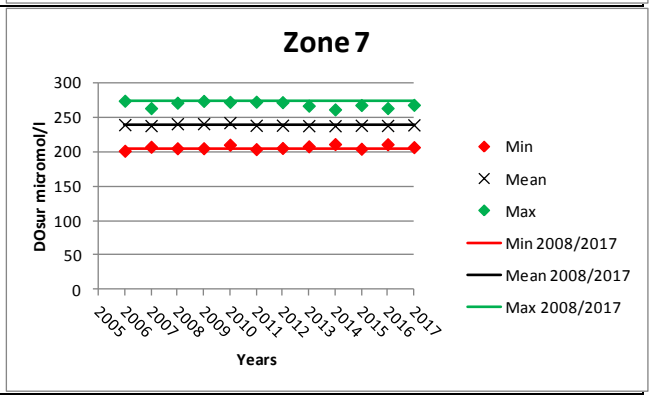












Trix index

Trophic conditions along the coasts could be represented by the TRIX index. In CADEAU project it is evaluated for the whole computational domain but it is reported in the bulletin only for the coastal zones (1, 2, 3, 4 and 5). It is higher along Italian coasts, with its maximum in the Po river mouth zone (zone 2).