Title: Contamination state assessment of the Regi Lagni basin. Maps of chemical and ecological risk

Tutor: Michele Arienzo
Co-tutors: Gaetana Napolitano, Maria Toscanesi, Alessio Langella, Carlo Donadio
=============

Research program:

The research answers to the urgent scientific and social demand of extensive research on the characterization of the ecological state of one of the highest anthropized area of the Campania region, Regi Lagni basin. This an area facing serious environmental threat and made by a complex network of artificial canals which crosses the Campanian Plain along the provinces of Naples and Caserta, flowing from the Ager Nolanus discharges to the south of Castel Volturno. These channels, together with the Volturno River, have been devastated for a long time by discharges and riverbed overmining and abusive disposal of toxic wastes. Among pollutants of particular concern, there are those who are very persistent like heavy metals (HMs) and polycyclic aromatic hydrocarbons (PAHs). These are in fact pollutants widely distributed in water, atmosphere, soil and sediment and among PAHs especially those comprising two or more benzene rings. PAHs, have been listed as priority pollutants by the US Environmental Protection Agency (EPA) and 16 PAHs have been regarded as the most important substances and adopted as routine test items in risk assessment and environmental monitoring.

An extensive and systematic field sampling campaign will be carried in the Regi Lagni basin; at specific sites sediments carrots will be also taken to reconstruct the history of pollutant deposition.

The study aims to characterize the chemical, sedimentological/morphological, and ecological features of the sediments of the Regi Lagni basin, with presumed outstanding levels of individual PAHs and HMs. More in deep, it will be studied: the levels and distribution of PAHs and HMs in sediments; the oxidative stress on target model and through biochemical indicator models of ecological stress; the mapping of pollution and the risk for biota.

Proposal for a PhD position: The project envisages collaboration with:
Department of Chemical Sciences of the Federico II University for chemical-physical analyses;
Parthenope University for the analysis of chemical and matrix changes on the occurrence of oxidative stress, adaptive redox responses and metabolic changes to environmental modifications.

Year 1: collection of superficial sediments and undisturbed sediment cores; chemical-physical-sedimentological analysis: texture, total organic carbon, TOC, granulometry and morphoscopy, mineralogical composition.
Second year: qualitative/quantitative analysis of HMs and PAHs, metal enrichment factors and pollution index calculations for elative ranking of sampling sites, sources index calculations; toxicity assessment of PAHs through the determination of Effects Range-Low (ERL), Effects Range-Median (ERM), Threshold Effects Levels (TEL) and Probable Effects Levels (PEL). Oxidative stress analyses, identification of specific biomarkers to classify the impact of pollutants, anthropogenic risk maps.
Third year: data elaboration and processing; statistical analysis of chemical/ecological data. writing papers in indexed journals.

===================

- o **MUR**
- o **PNRR**
- o **Entrambe X**