

# Oxygen conditions and biogeochemical responses in Black Sea ecosystems: Investigations in the EU-Project HYPOX\*

\*In situ monitoring of oxygen depletion in hypoxic ecosystems of coastal and open seas, and land-locked water bodies

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**Introduction** | Eutrophication and global warming promote the occurrence of hypoxic (low oxygen) conditions in aquatic systems. In the framework of the EU-funded project HYPOX (www.hypox.net) the oxygen deficient Black Sea is used as a natural laboratory to investigate causes and consequences of hypoxia formation. Target sites are the Crimean Shelf, the Bosphorus outlet area, and the Romanian Shelf.

## 1 | Crimean shelf | oscillating oxygen conditions

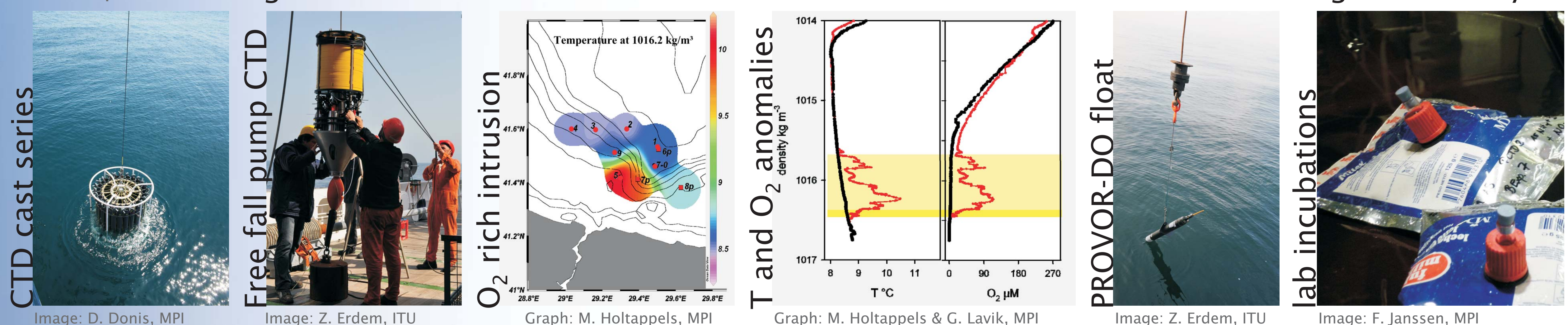
**Tasks** | monitoring characteristics of O<sub>2</sub> oscillation and the effect on benthic communities and processes



**Results** | vast oxygen variability impairs benthic macrofauna and microbial activity

## 2 | Bosphorus outlet area | Marmara Sea water injections

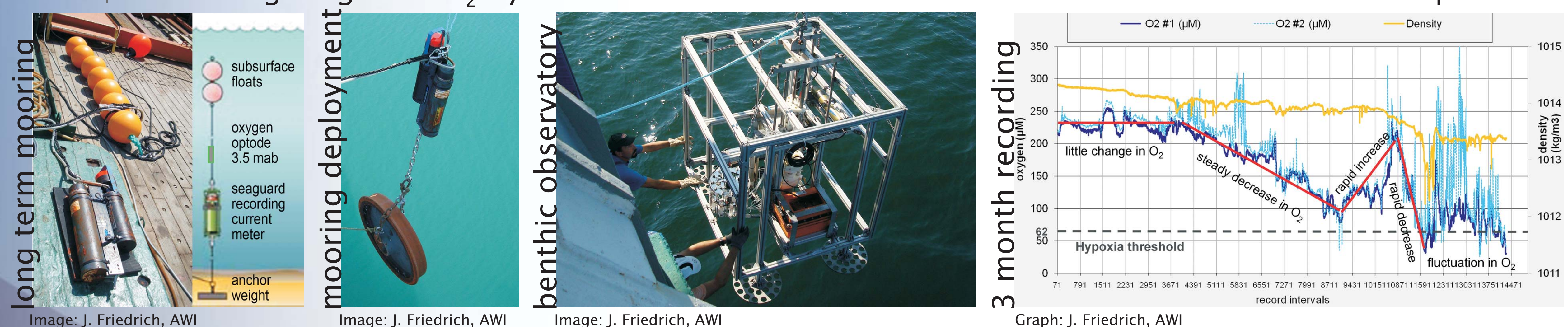
**Tasks** | monitoring O<sub>2</sub> rich saltwater intrusions and their effect on anoxic water column biogeochemistry



**Results** | oxygen intrusions are highly variable with strong effect on microbial nitrogen conversion

## 3 | Romanian shelf | former heavy eutrophication

**Tasks** | monitoring long term O<sub>2</sub> dynamics under reduced nutrient load and the role of benthic respiration



**Result** | high benthic oxygen uptake and strong stratification still cause summer hypoxia

**Conclusions** | Different oxygen observation methods were used to cope with differences in oceanographic settings (physical vs. biological hypoxia drivers) and infrastructure (accessibility, ship traffic). Unexplored, substantial dynamics in hydrography and oxygenation have an extensive impact on Black Sea ecosystems on the level of faunal and microbial communities as well as biogeochemical processes. These dynamics with a temporal scale of hours to days can cause large dead zones on the Black Sea shelf and should be further studied by long term observation.

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