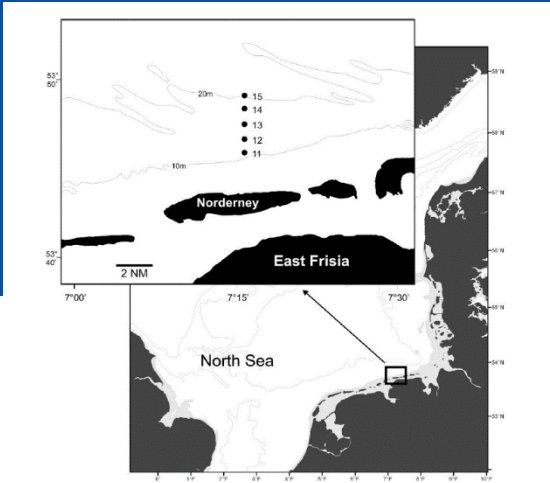
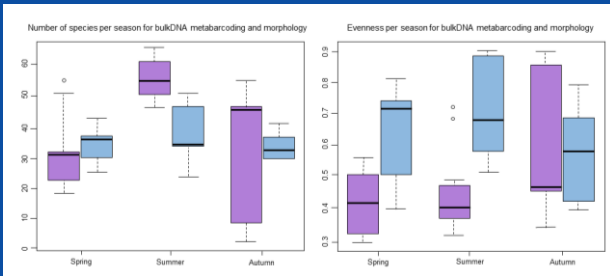


DNA-based impact monitoring: the case of long-term monitoring at Norderney island

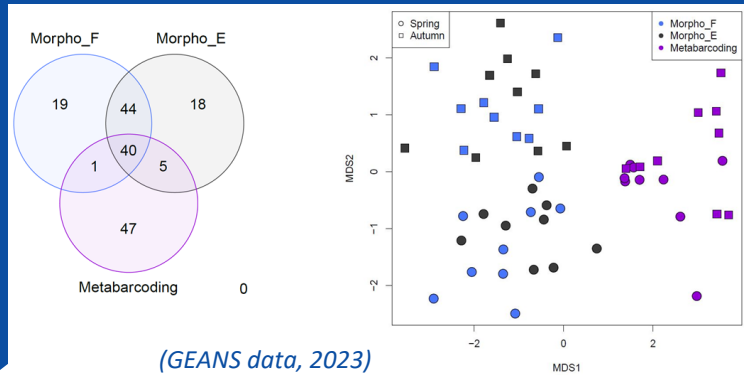


Norderney island, in the Wadden Sea, is a long-term benthic study site with an impressive 45 year time series that is based on classical sampling and morphological identification. Can DNA-based monitoring be used instead, without compromising the value of the time series?

Compatibility was tested by comparing **bulk DNA metabarcoding** (15 ethanol samples < sediment) and morphology-based analyses (23 formalin samples < sediment) from 5 stations in 3 seasons.



Number of species and evenness for each method in each season for metabarcoding (purple) and morphology (blue).



Unique and shared species between metabarcoding (purple) and morphology (ethanol black and formol blue) for spring and autumn.



- Bulk DNA metabarcoding detected **significantly more species** and had **significantly lower Shannon diversity** than morphology-based analyses.
- Evenness patterns were not significantly different, but both methods detected different macrobenthos species: **only 25% of species were shared**.
- **Seasonal patterns** in communities were picked up by both methods. However, the **indicator species** were largely different.

Implementing DNA-based monitoring into long-term monitoring programs should be carefully considered: especially at the species level, results can be expected to differ substantially! At the community level, DNA-based monitoring proves equally appropriate.