

# Fine-Scale Variability in Harbour Porpoise Acoustic Detections in the North-Western Baltic Sea

Schubert, A.<sup>1</sup>, Ham, G.S.<sup>1</sup>, Plön, S.<sup>1</sup>, Voss, J.<sup>1</sup>, Diederichs, A.<sup>1</sup>

<sup>1</sup>) BioConsult SH GmbH & Co. KG, Schobüller Str. 36, D-25813 Husum, Germany

## Introduction:

- Harbour porpoises were monitored using passive acoustic monitoring (PAM)
- Seasonal patterns are often assumed to be consistent between years
- Interannual variability may differ between locations
- We assessed whether temporal detection dynamics are stable or variable across stations

## Methods:

- Data from 30 CPOD moorings (see figure 1)
- Two consecutive years (2023 and 2024) of daily detection rates (DP10M/d)
- Time series smoothed using LOESS to extract seasonal patterns
- Interannual similarity quantified using correlation of standardised time series (shape)

## Results

- Stations separated into two main groups based on interannual similarity
- One group showed highly consistent seasonal patterns between years (all stations in Kriegers Flak)
- A second group exhibited pronounced variability, including shifts in timing and altered seasonal structure (most stations in Kattegat)
- Clusters show clear spatial structuring
  - Stable and variable stations occur in distinct subareas
- Variability occurred at fine spatial scales, even within the same subareas

## Discussion

- The results suggest local environmental or habitat-driven differences at small spatial scales
- Interannual variability is therefore not spatially uniform

- Interannual dynamics of harbour porpoise detections vary strongly across stations
- Some locations are highly consistent, others are not
- PAM data should be interpreted in a spatially explicit and multi-year context

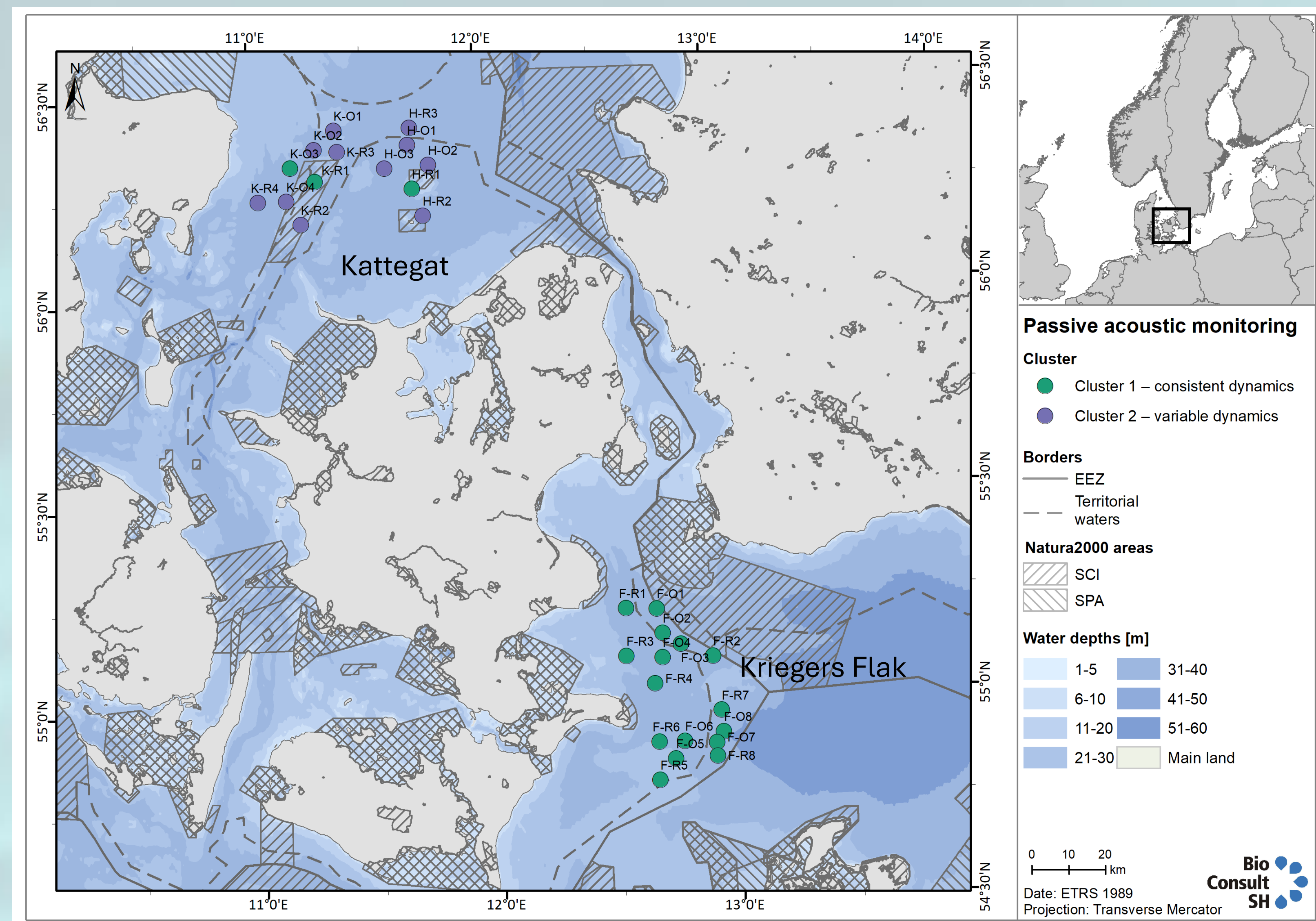


Figure 1: Study area in the Kattegat (N) and Kriegers Flak (S) in the Baltic Sea showing 30 C-POD stations assigned to clusters based on similarity in temporal detection dynamics.

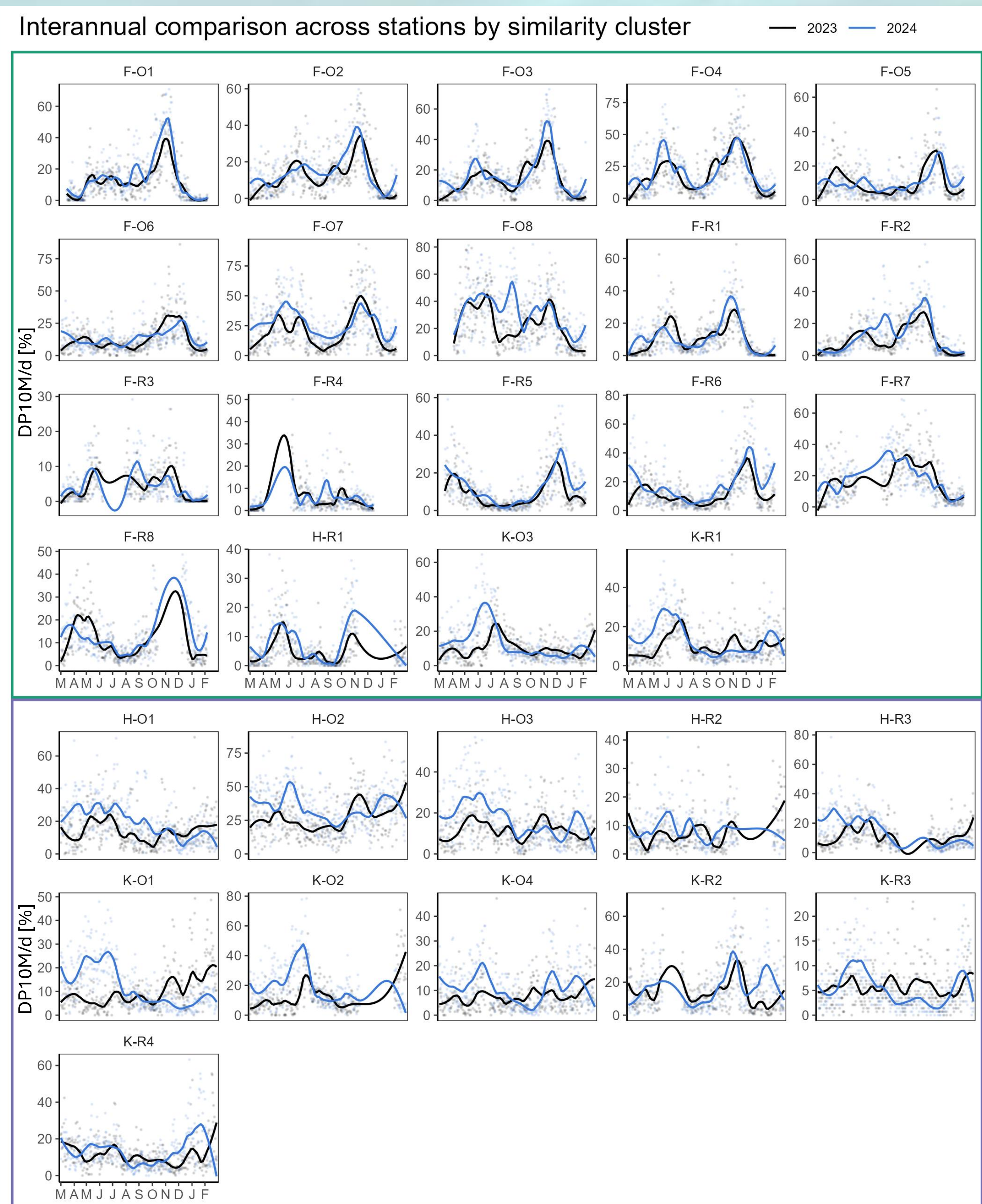


Figure 2: Phenology of the 2 clusters reveals a pronounced phenology in Kriegers Flak (teal green) and high variability between stations in Kattegat (lavender-blue) in the years 2023 and 2024.

