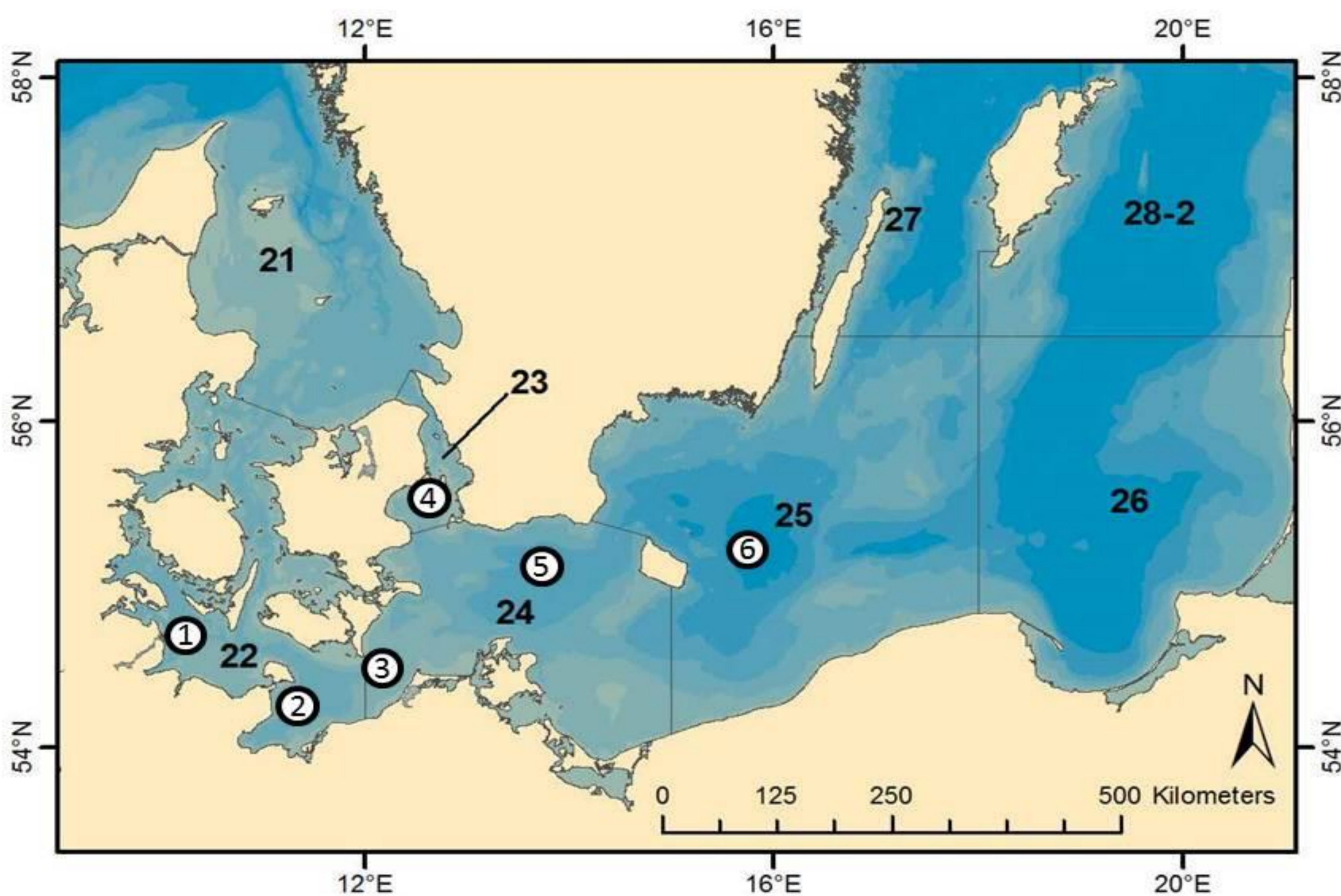


# Use of otolith quality flags to assess distributional dynamics in Baltic cod stocks

Sven Stötera, Uwe Krumme

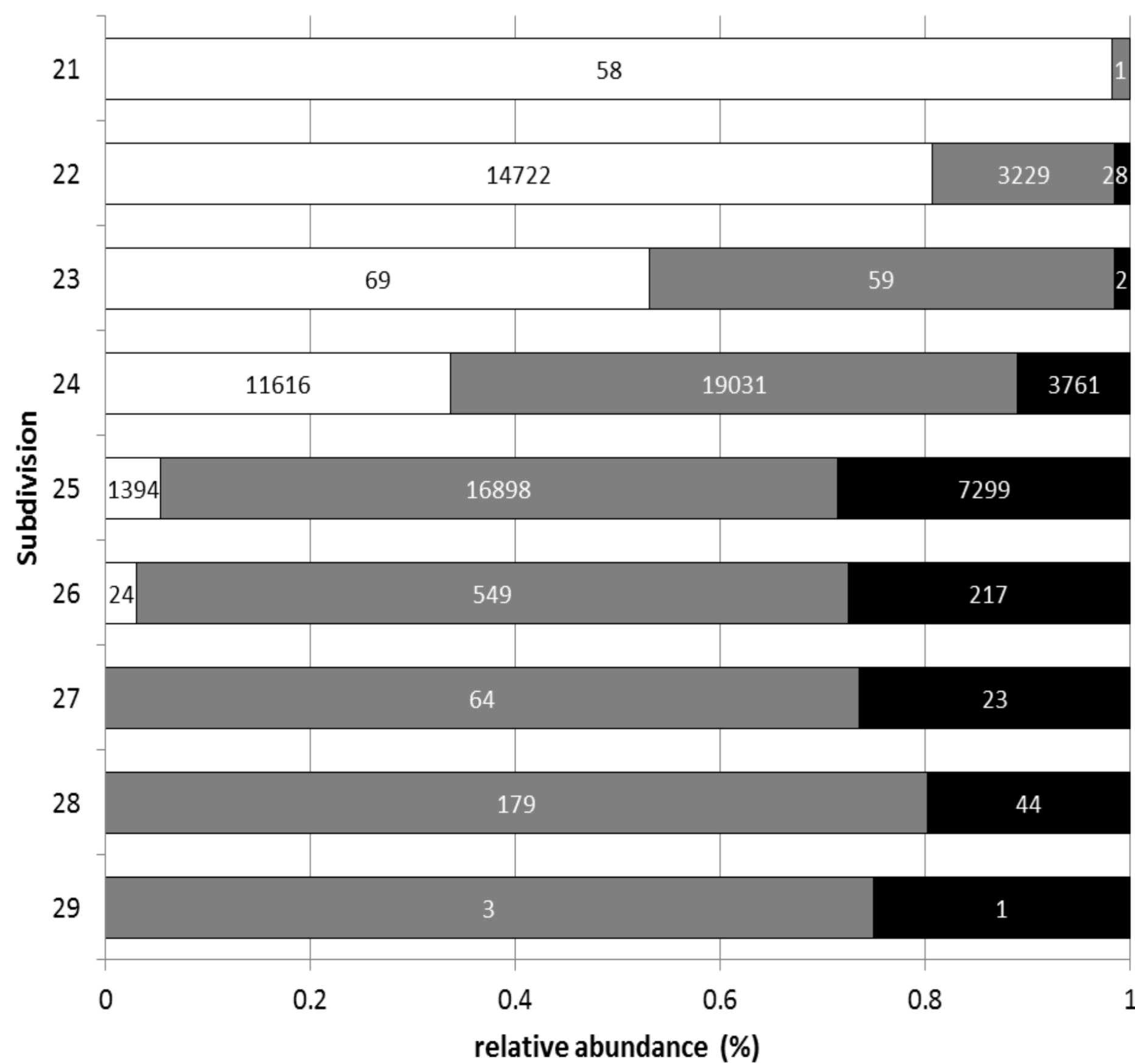


In the Baltic Sea cod spawn in several basins separated by shallower sills. The mixing dynamics between the two Baltic cod stocks remain largely unclear. We assessed spatio-temporal patterns in the distributions of readability categories of Baltic cod otoliths.



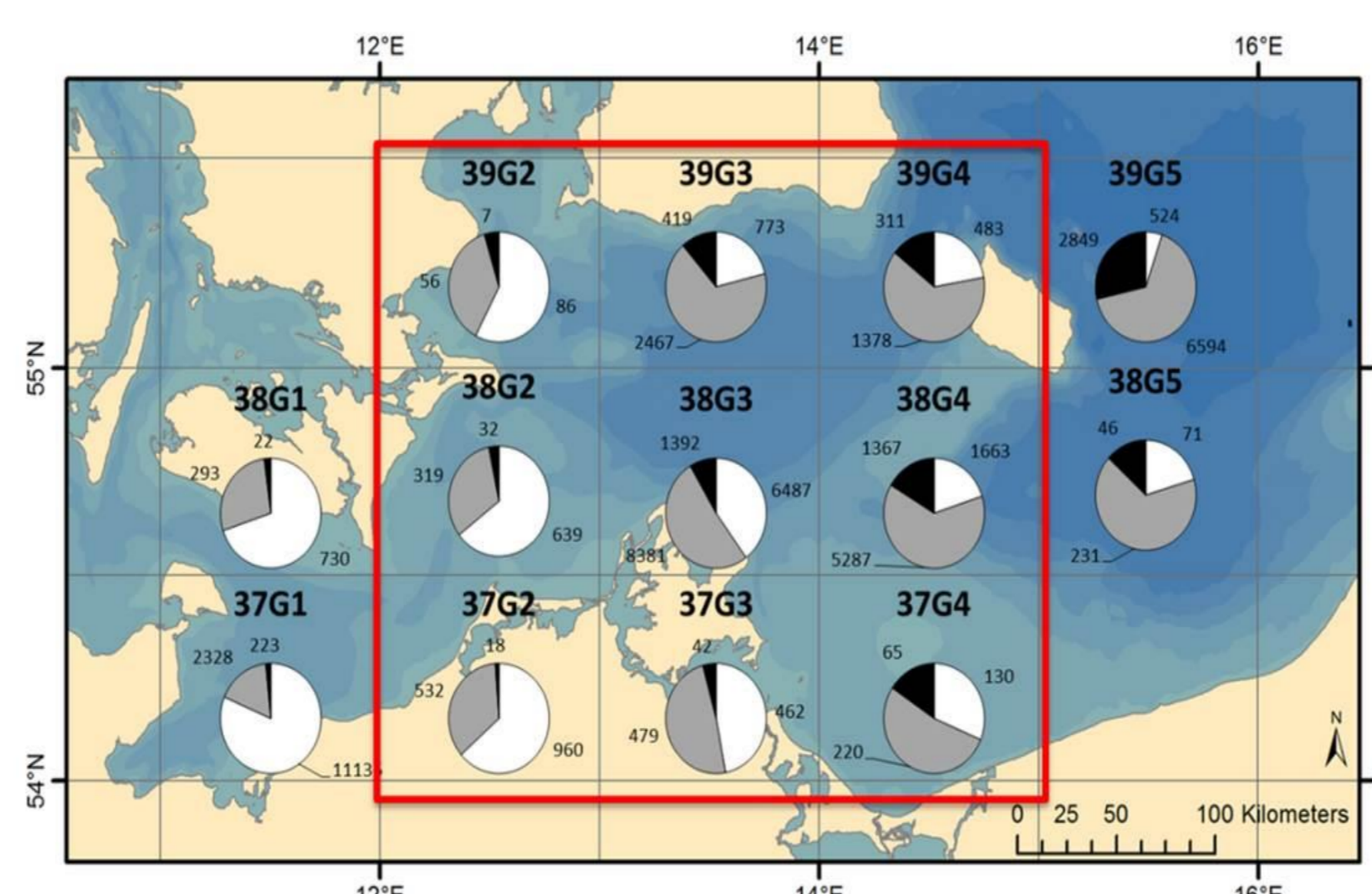
Baltic Sea, ICES Subdivisions with prominent hydrographical features and water depth. Two spawning grounds overlap in SD24

- ① Kiel bight
- ② Mecklenburg bight
- ③ Darß sill
- ④ Drogden sill
- ⑤ Arkona basin
- ⑥ Bornholm basin

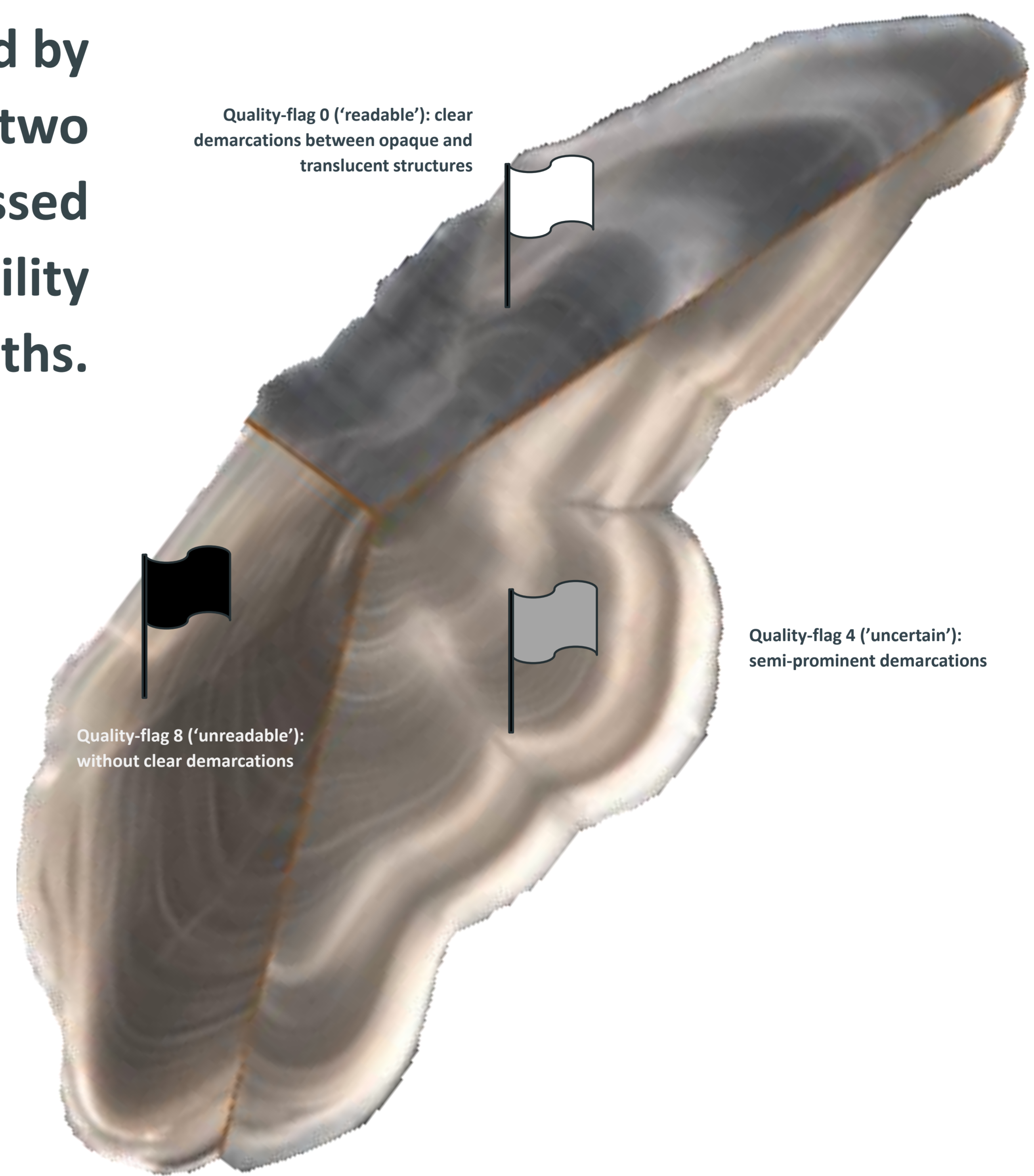


Overall proportions of 3 quality flag categories assigned to cod otoliths from SD21 - SD29. Sample sizes are given for each stratum

The readability categories of cod otoliths in the Baltic Sea (ca. 80.000 otoliths from 2007-2013) displayed a consistent pattern. Darß and Drogden sills separated SD21 - SD23 with higher proportions of readable otoliths in the west



Proportion of 3 quality flag categories assigned to cod otoliths from specific rectangles in SD22, SD24 (red frame) and SD25



Quality-flag 0 ('readable'): clear demarcations between opaque and translucent structures

Quality-flag 8 ('unreadable'): without clear demarcations

Quality-flag 4 ('uncertain'): semi-prominent demarcations

from SD25-29 and with lower proportions of readable otoliths in the east. SD24 proved to be a mixing area.

This suggests that increased spillover from the east has not occurred since 2007. However, the large proportion of uncertain otoliths SD24 in and inconsistencies in Quality flags determination may mask the detection of trends in mixing.

**Outlook**

The interpretation of Baltic cod otoliths needs further refinement, which requires improved cross-validations, using e.g. tagging and laboratory experiments, genetics, otolith shapes and microchemical analyses.