



“Redefining biotopes in offshore coarse and mixed sediments”

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<http://www.cefas.co.uk/alsf/projects/natural-seabed-resources/09p93/final-report.aspx>

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Project partners –
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Introduction



- **Project directive**
 - To facilitate habitat mapping (within current classification schemes) of offshore particulate sediments using survey data
- **Two main aims**
 - Development of a standard methodology for defining potential new biotopes or regional variants
 - Development of “BioScribe” – a decision support tool for ascribing biotopes



Habitat Classification Schemes

- **Hierarchical**
- **UK**
 - Marine Nature Conservation Review (MNCR) habitat classification scheme for Britain and Ireland (Connor *et al.*, 1997)
- **Europe**
 - European Union Nature Information System (EUNIS)

Habitats and Biotopes



- **“Habitat”**
 - An area of specific environmental (physical and chemical) conditions
- **“Biotope”**
 - A habitat supporting a specific assemblage of plants and animals, operating together at a specific scale (Connor *et al.*, 1997)
 - Combines the concepts of habitat and community for defining geographical units (Connor *et al.*, 2004)

Redefining Biotopes in offshore particulate sediments



Why?

- Coastal and offshore marine particulate sediment biotopes currently under-represented
- Provide information on natural cycling and transitions between biotopes
- “..it would be necessary to further refine existing (biotope) classifications to ensure that they are sufficiently accurate for monitoring changes in the long term.” (Olenin & Ducrotoy, 2006)



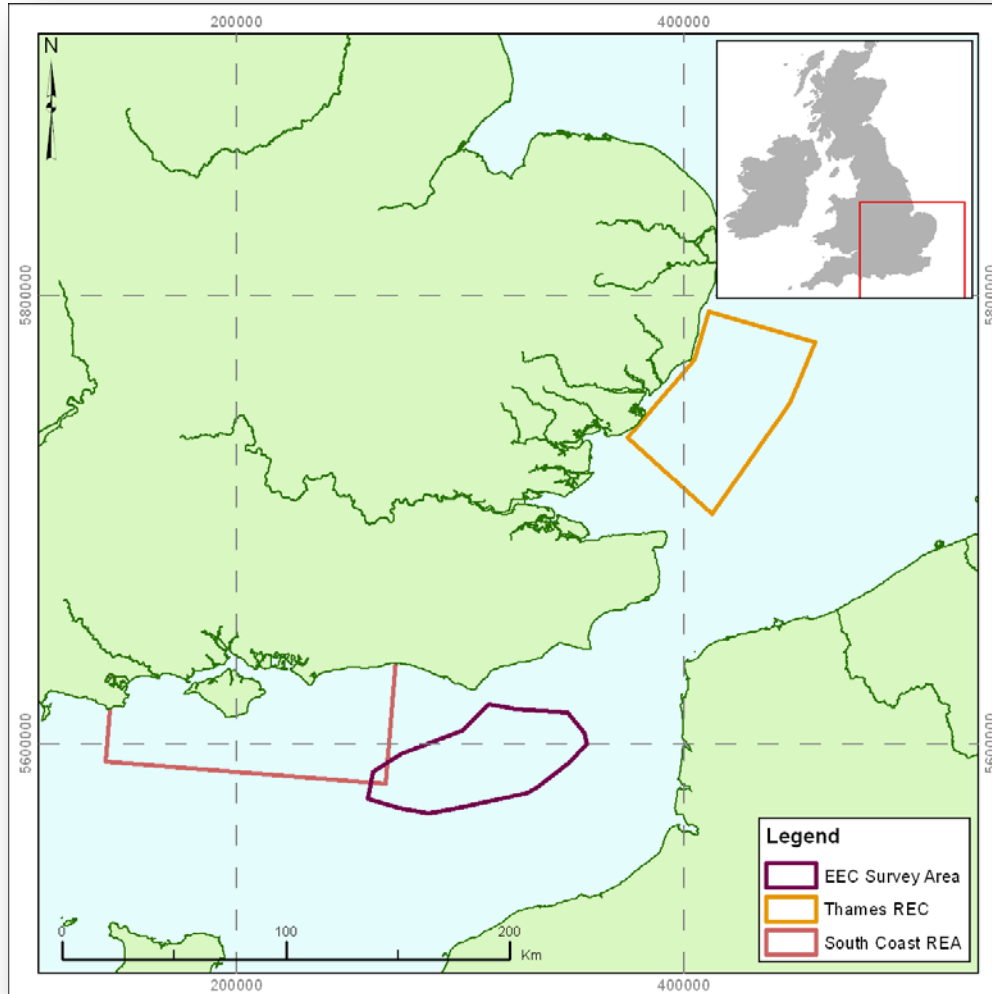
Project Methods



- Four datasets were compiled
 - Eastern English Channel (EEC) 2005
 - EEC 2008
 - South Coast Regional Environmental Assessment (SCREA)
 - Thames Regional Environmental Characterisation (TREC)
- Incorporated a wide variety of habitats, taking into account temporal variability within a region, and variation both within and between regions



Survey Regions



Data used

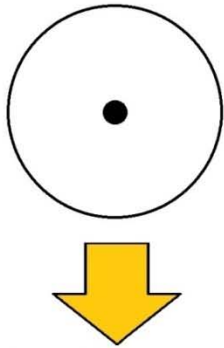


- Biological data
 - 0.1m² Hamon grab data
- Habitat data
 - Particle Size data (from grab samples)
 - % coverage of principle sediment components (from static image analysis)
 - Location data, e.g.
 - Water depth (m bcd)
 - Positional data (Latitude/Longitude, Region)



Data used

Target Circle



Grab Sample (Fauna)



Grab Sample (PSA)



**Static Image from
video survey**

Data used

- In total, data from **907** sample stations analysed
- Static images obtained at same stations (directly comparable)
- Non-numeric data included in analyses
 - Sediment classifications, e.g.
 - Folk
 - Wentworth
 - Previous biotope classifications

Analyses

- Data reconciled (including nomenclature check using WoRMS taxon match tool)
- Imported into PRIMER v6
- Bottom-up approach, where biological groups identified initially, then habitat (sediment/depth) data applied to refine and rationalise groupings
- Attempt to match groupings with existing biotopes

Results

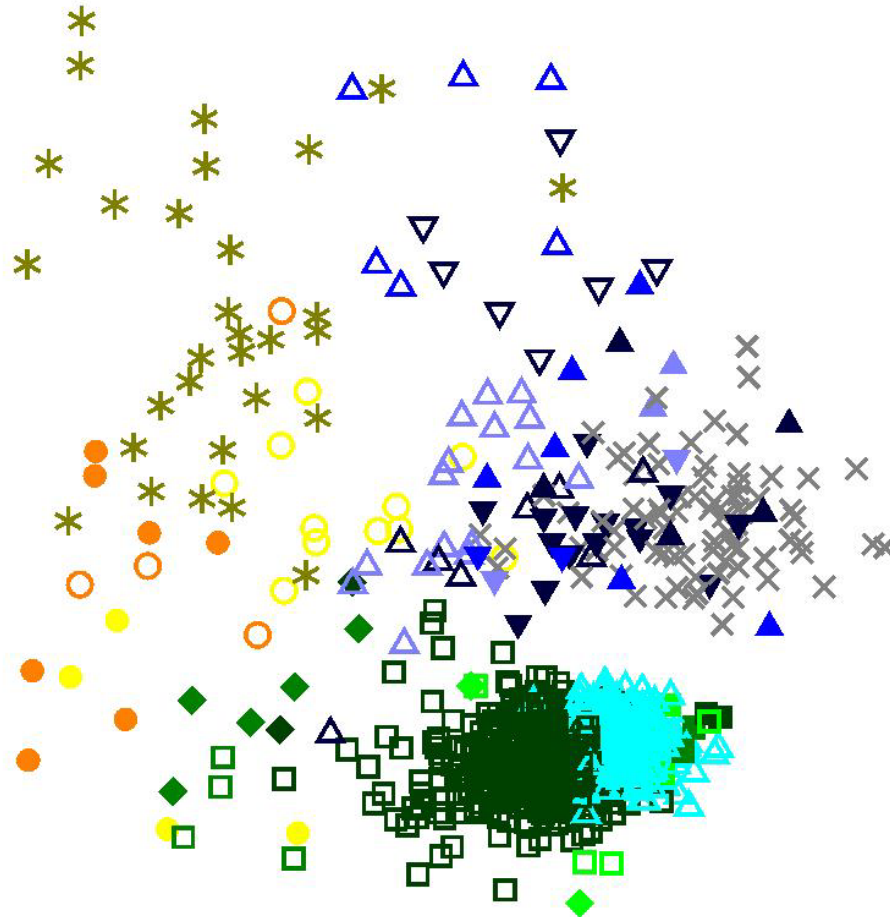


- 13 environmental variables used for BEST analysis
 - Minimum number of variables – **depth** (m bcd), % **sand** (PSA), % **sand** (image analysis) and **Longitude**. Correlation = 0.731.
- Comparison of biological data using Folk vs Wentworth classifications (ANOSIM)
 - **Folk** – Global R = 0.375, sig. = 0.1%
 - **Wentworth** - Global R = 0.369, sig. = 0.1%

Biotopes

Transform: Square root
Resemblance: S17 Bray Curtis similarity

2D Stress: 0.17



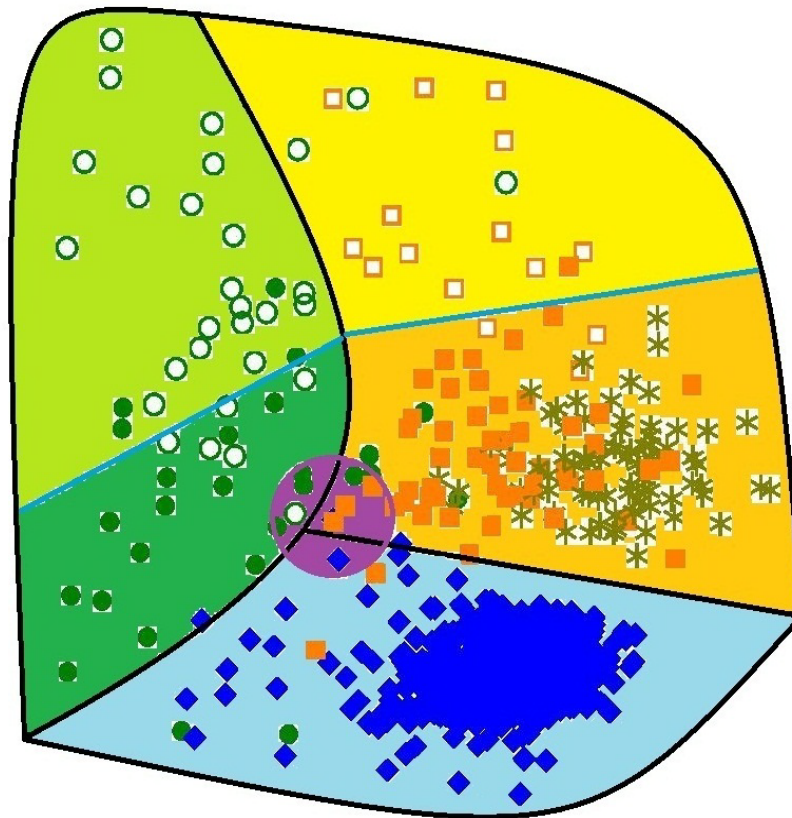
Biotope codes

- SS.SSa.CFiSa.Po
- SS.SSa.CFiSa.PoVen
- SS.SSa.CFiSa.EpusVenPo
- SS.SSa.CFiSa.PoEpusTbAm
- * SS.SSa.IFiSa.NcirBat
- SS.SCS.CCS.GalPosPo
- SS.SCS.CCS.GalPosBri
- SS.SCS.CCS.GalThrVen
- SS.SCS.CCS.EpusPoGly
- SS.SCS.CCS.GlapPo
- △ SS.SCS.CCS.MedLumVen
- SS.SCS.CCS.PosGalPo
- ◆ SS.SCS.CCS.GlapPoVen
- ◆ SS.SCS.CCS.EpusPoNus
- ◆ SS.SCS.CCS.GlyPoTbAm
- ▲ SS.SMx.CMx.AmpLumBri
- ▲ SS.SMx.CMx.TbAmPoPsa
- ▲ SS.SMx.IMx.LanBAalb
- ▼ SS.SMx.CMx.LumPosEpus
- ▼ SS.SMx.CMx.PoAmpAsqu
- ▼ SS.SMx.CMx.AsquPosPo
- △ SS.SMx.CMx.SmAsPoVen
- ▲ SS.SMx.IMx.NepNusAalb
- ▲ SS.SMx.CMx.LumGlapB
- ▼ SS.SMx.IMx.LanLumAmp
- × SS.SBR.PoR.SspiMx

Habitat overview

Transform: Square root
Resemblance: S17 Bray Curtis similarity

2D Stress: 0.17



Key:

Habitats Level 4 only

- SS.SSa.IFiSa
- SS.SSa.CFiSa
- ◆ SS.SCS.CCS
- SS.SMx.IMx
- SSS.SMx.CMx
- * SS.SBR.PoR

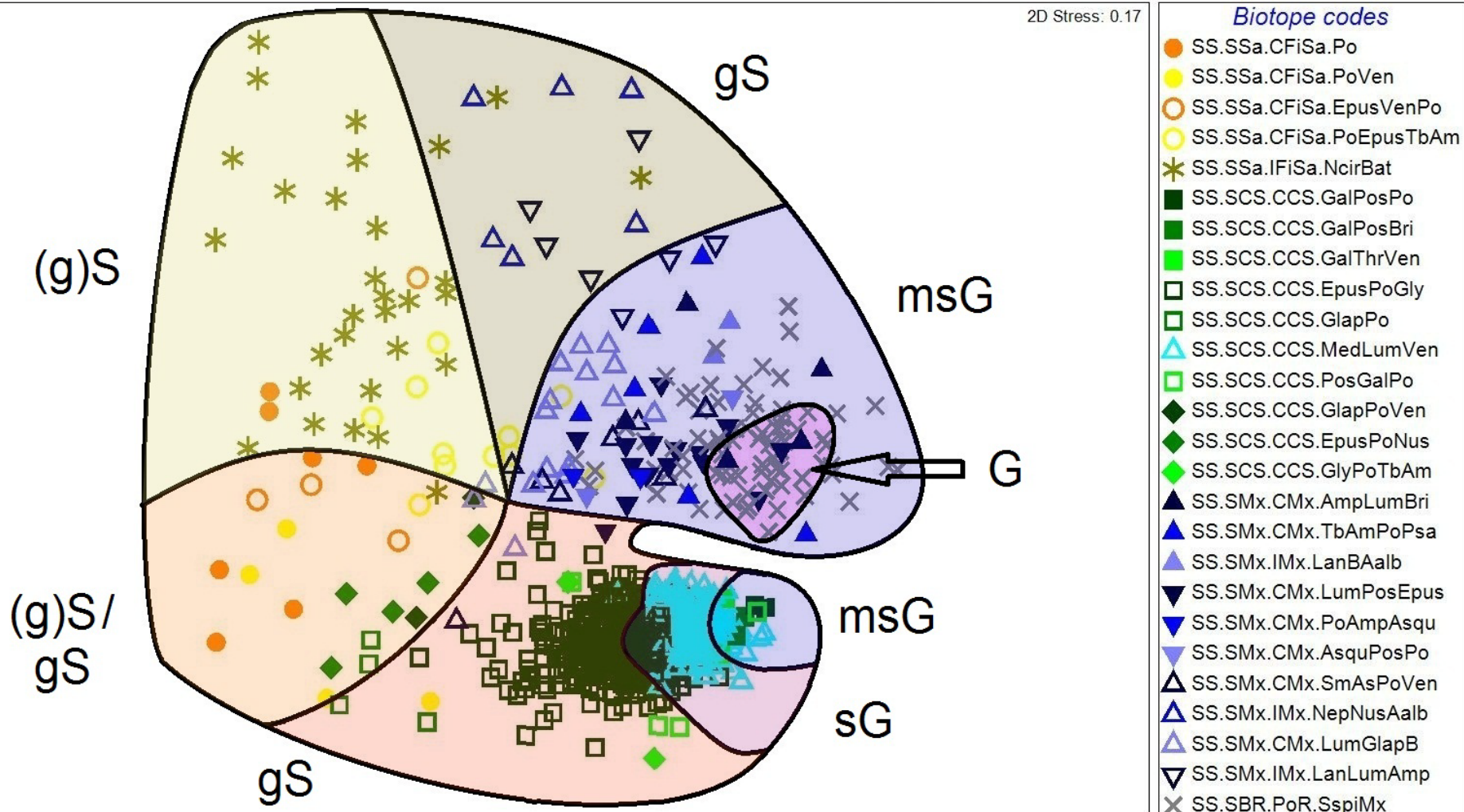
- Infralittoral Fine Sands
(EUNIS code A5.23)
- Circalittoral Fine Sands
(EUNIS code A5.25)
- Circalittoral Coarse Sediment
(EUNIS code A5.14)
- Infralittoral Mixed Sediments
(EUNIS code A5.43)
- Circalittoral Mixed Sediments /
Biogenic aggregations/reefs
(EUNIS codes A5.44 / A5.61)

Sand / Coarse / Mixed Sediment
overlap

Biotopes with Folk Classifications

Transform: Square root
Resemblance: S17 Bray Curtis similarity

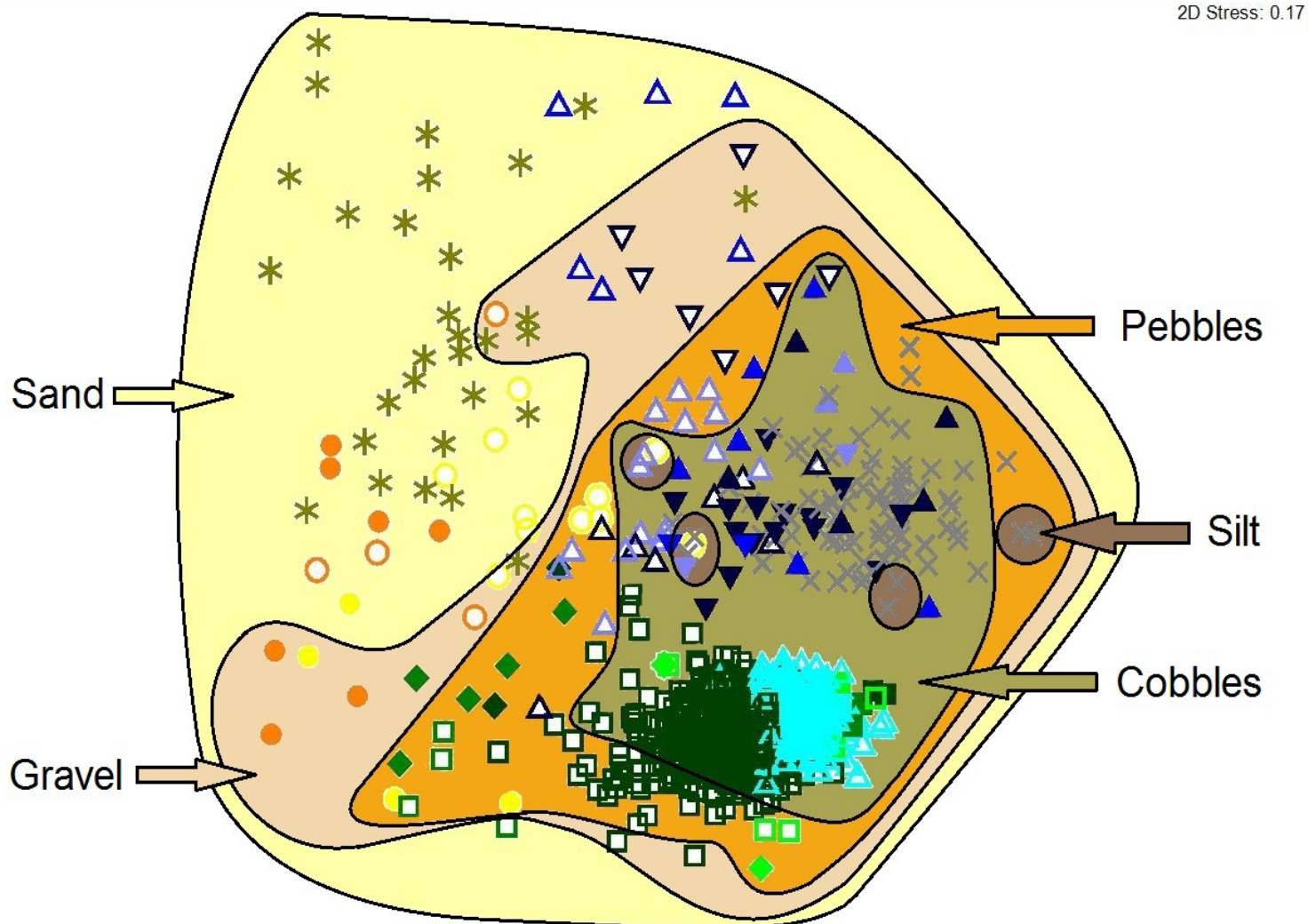
2D Stress: 0.17



Biotopes and surface components

Transform: Square root
Resemblance: S17 Bray Curtis similarity

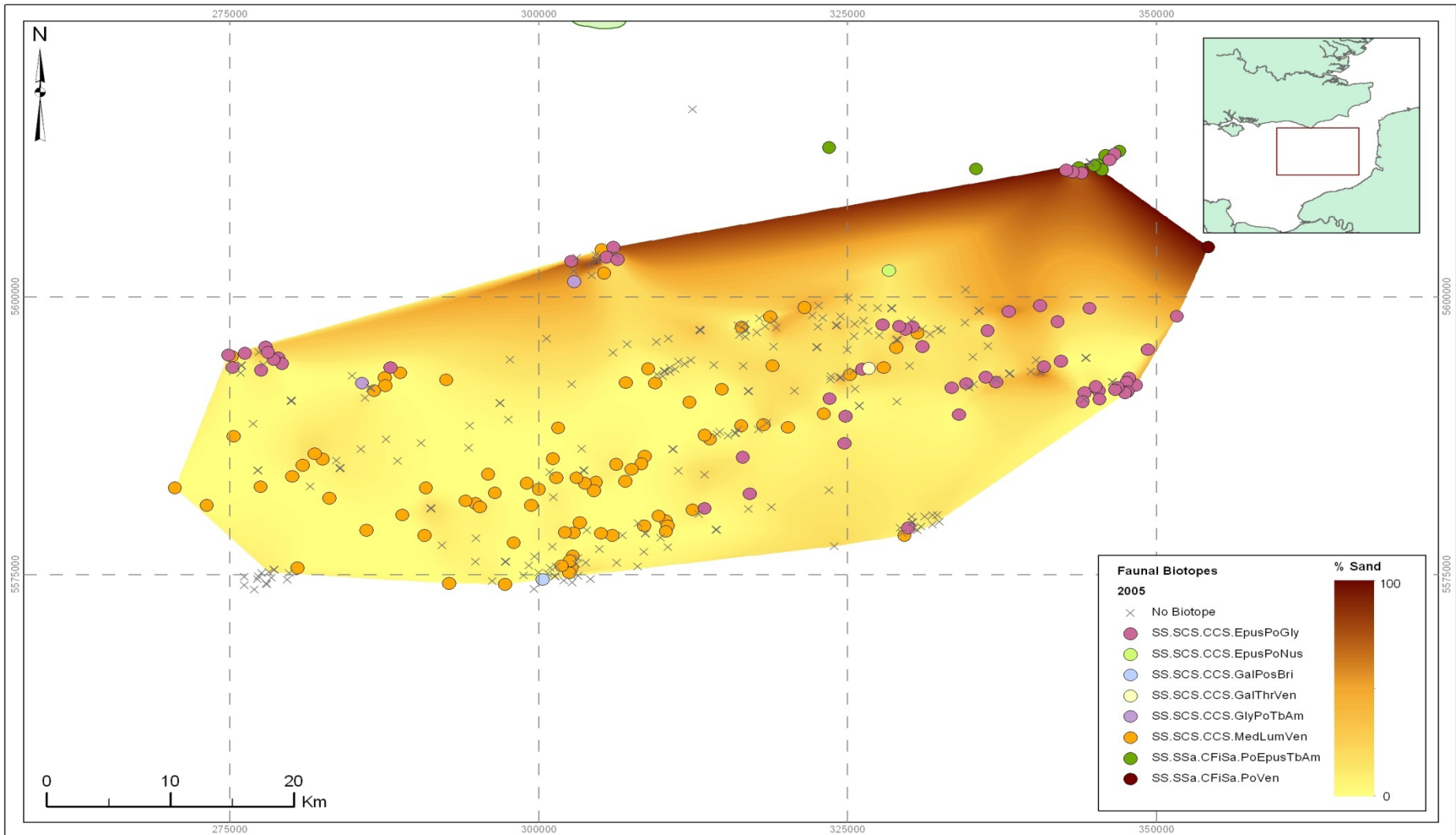
2D Stress: 0.17



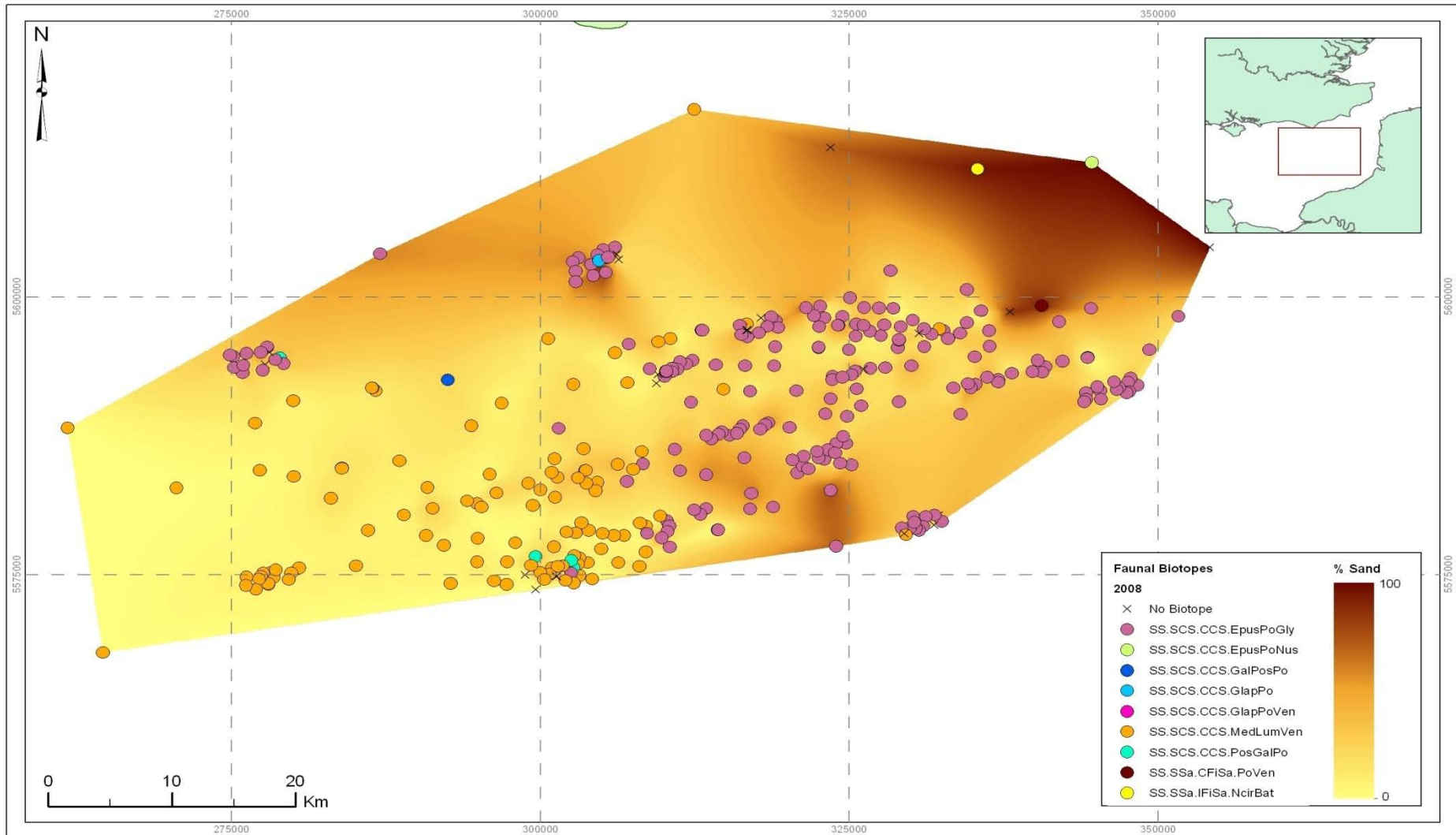
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- SS.SCS.CCS.GalPosBri
- SS.SCS.CCS.GalThrVen
- SS.SCS.CCS.EpusPoGly
- SS.SCS.CCS.GlapPo
- △ SS.SCS.CCS.MedLumVen
- SS.SCS.CCS.PosGalPo
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- ◆ SS.SCS.CCS.GlyPoTbAm
- ▲ SS.SMx.CMx.AmpLumBri
- ▲ SS.SMx.CMx.TbAmPoPsa
- ▲ SS.SMx.IMx.LanBAalb
- ▼ SS.SMx.CMx.LumPosEpus
- ▼ SS.SMx.CMx.PoAmpAsqu
- ▼ SS.SMx.CMx.AsquPosPo
- △ SS.SMx.CMx.SmAsPoVen
- ▲ SS.SMx.IMx.NepNusAalb
- ▲ SS.SMx.CMx.LumGlapB
- ▼ SS.SMx.IMx.LanLumAmp
- × SS.SBR.PoR.SspiMx

Temporal variation – EEC 2005



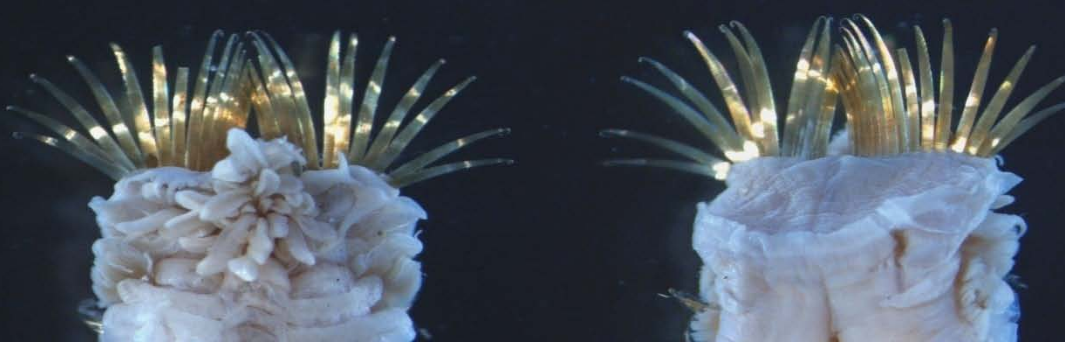
Temporal variation – EEC 2008



Summary – Project outputs

- A **Standard Methodology** for defining New Biotoxes / Regional Variants in particulate sediments
- **23 new potential biotoxes** were derived – with evidence of MedLumVen-EpusPoGly temporal cycling identified
- **One regional variant** described – SS.SBR.PoR.SspiMx.Cre
- **BioScribe** – a freely available biotope-matching decision support tool





Thank you for listening!

References

Connor, D.W., Dalkin, M.J., Hill, T.O., Holt, R.H.F., & Sanderson, W.G. 1997. Marine Nature Conservation Review: marine biotope classification for Britain and Ireland. Volume 2. Sublittoral biotopes. Version 97.06. JNCC Report, No. 230.

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Olenin, S. and Ducrotoy, J.-P., 2006. The concept of biotope in marine ecology and coastal management. *Marine Pollution Bulletin* **53**: 20-29.

BioScribe

BioScribe download site – www.jncc.defra.gov.uk/bioscribe