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Baltic Sea Maritime Spatial Planning
for Sustainable Ecosystem Services

Construction and study of use of the collaborative GIS “Baltic Explorer” for Maritime Spatial Planning

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Collaborative GIS (CGIS)



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- CGIS offers tools for structuring participation in group spatial decision processes (Balram & Dragicevic 2006).
- CGIS provides benefits for collaborative MSP
 - real-time interactions, inclusiveness, social learning and awareness about the shared challenges that need common solutions (Balram et al., 2003; Godschalk et al., 1992; Roche and Humeau, 1999).
- Collaborative MSP usually is set in the Same Time - Same Place dimension.

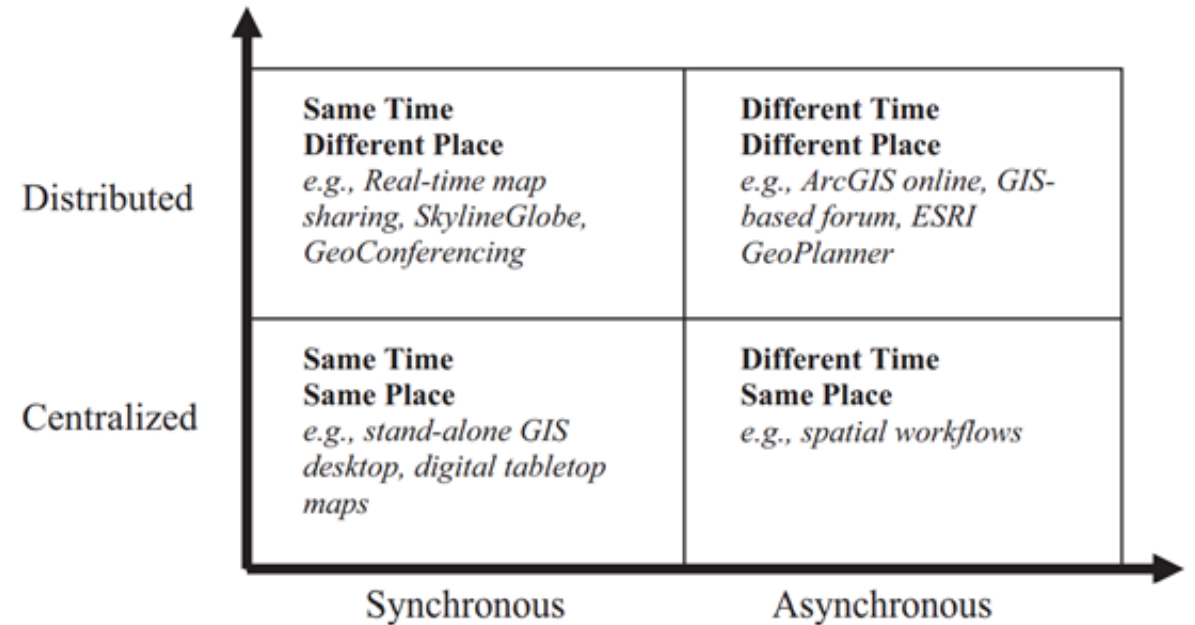


Fig. 1. Groupware classification based on time and place dimensions (Armstrong, 1993).

Maritime Spatial Planning



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- Marine or maritime spatial planning (MSP) requires multiple actors, such as planners and stakeholders, to work together for planning harmonic use of marine space, often in collaborative workshops (Arciniegas and Janssen, 2012; Pınarbaşı et al. 2017).
- In real-world MSP, collaboration digital spatial tools are used sparingly.

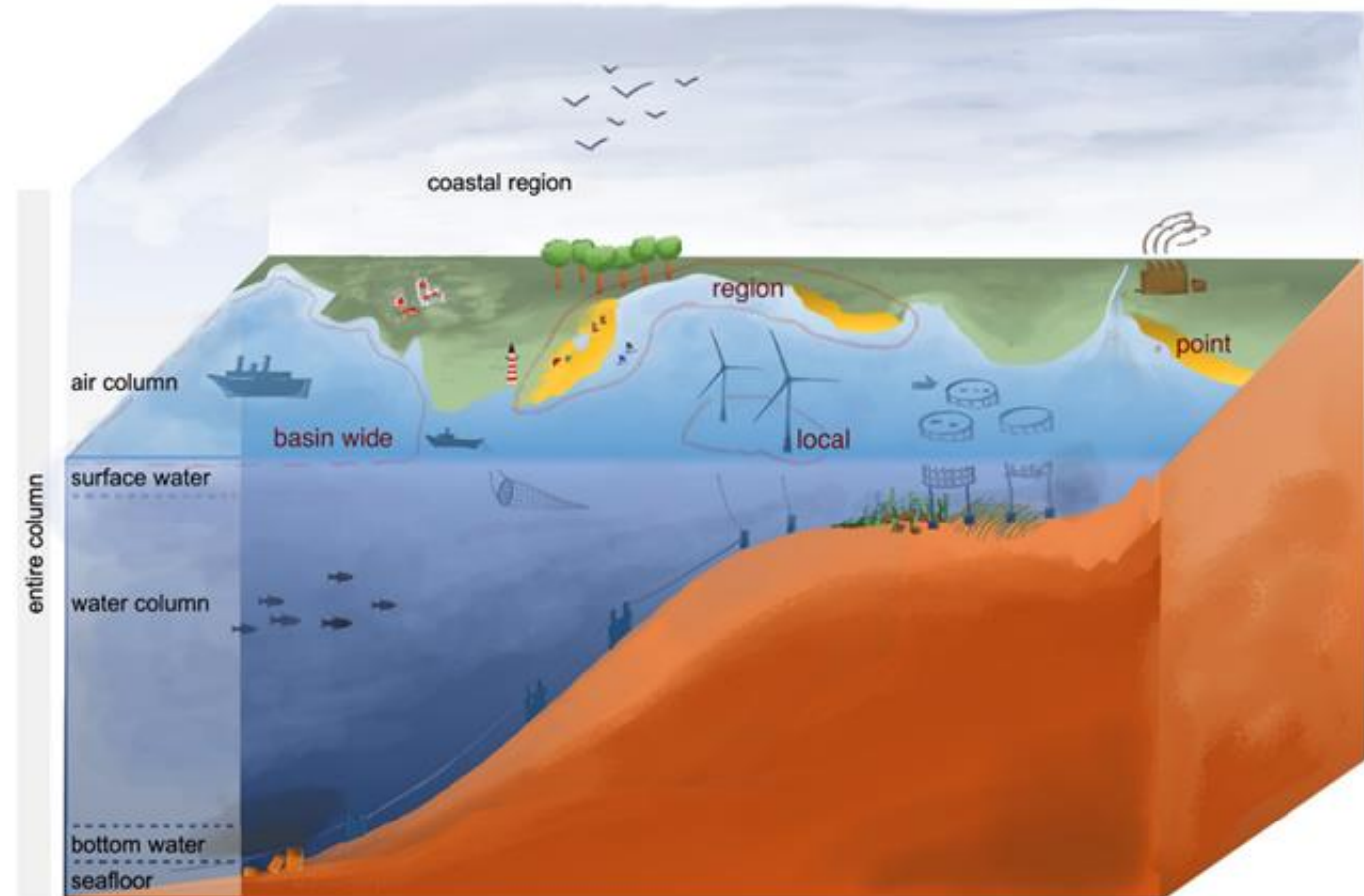


Image source: Holzhüter et al. 2019.

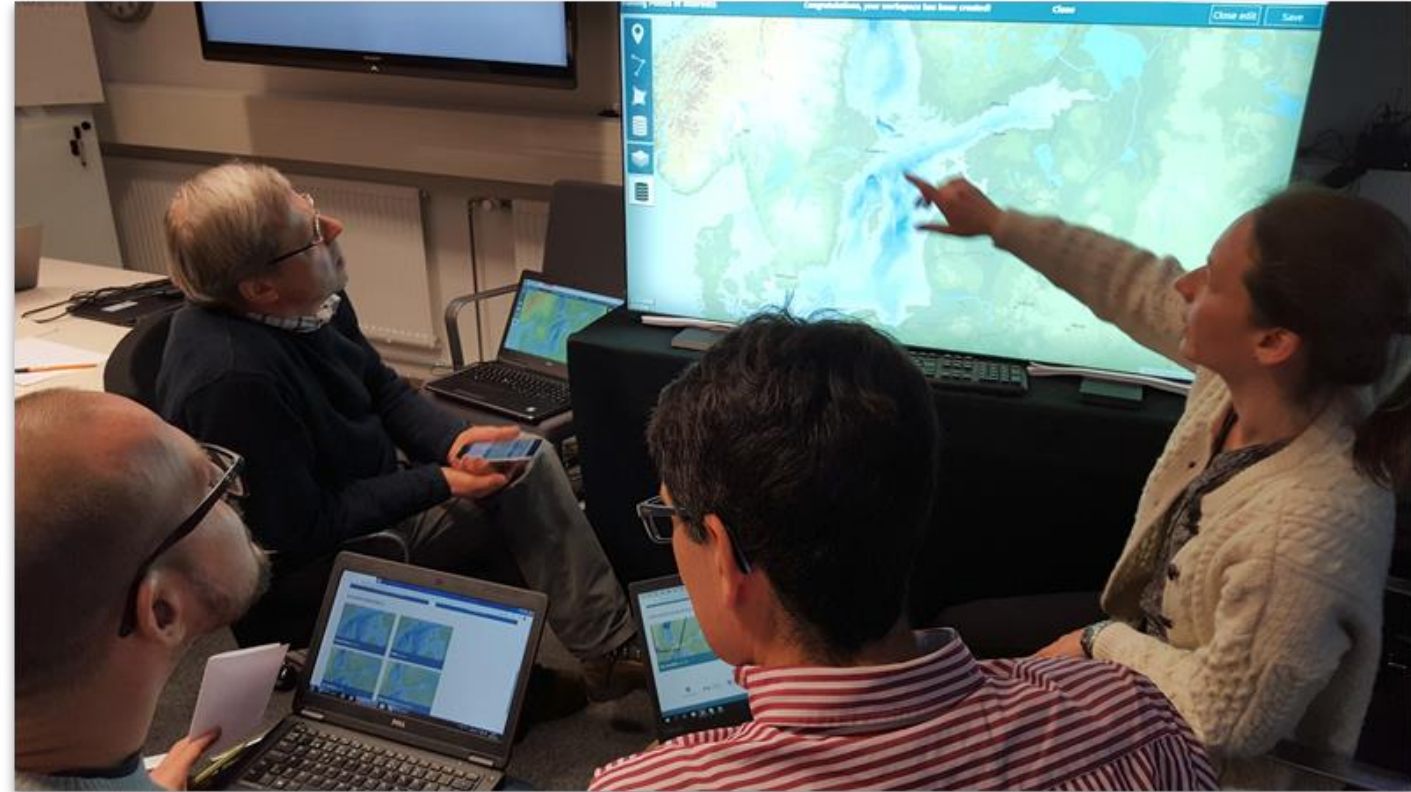
CGIS to support MSP collaboration



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Paper maps on table →



Shared online map workspace on multiple devices

Research goals and questions

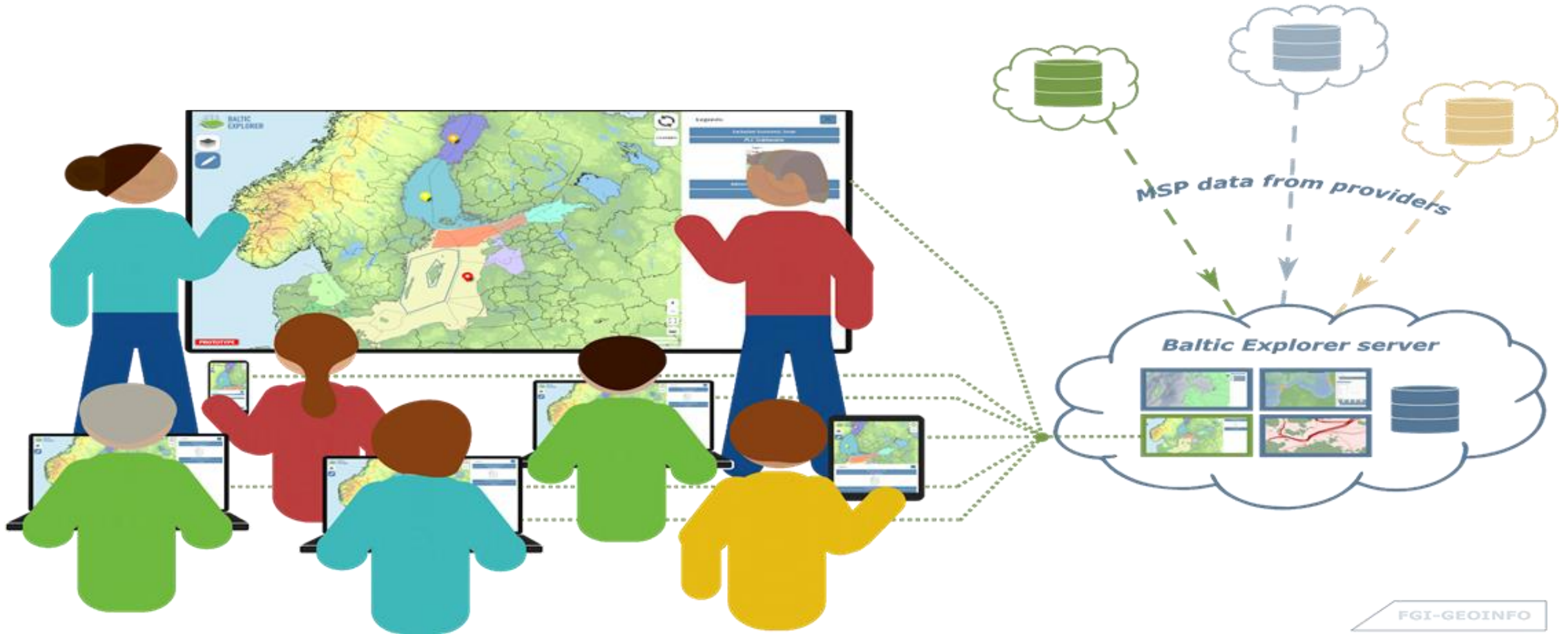


- Develop a functioning and effective collaborative GIS platform for MSP workshops
 - free, libre and open source.
- How different kinds of GIS tools can effectively support and facilitate collaboration in MSP workshops?
- What challenges are faced when a spatial analysis tool is used in a MSP workshop?

Concept and architecture of Baltic Explorer



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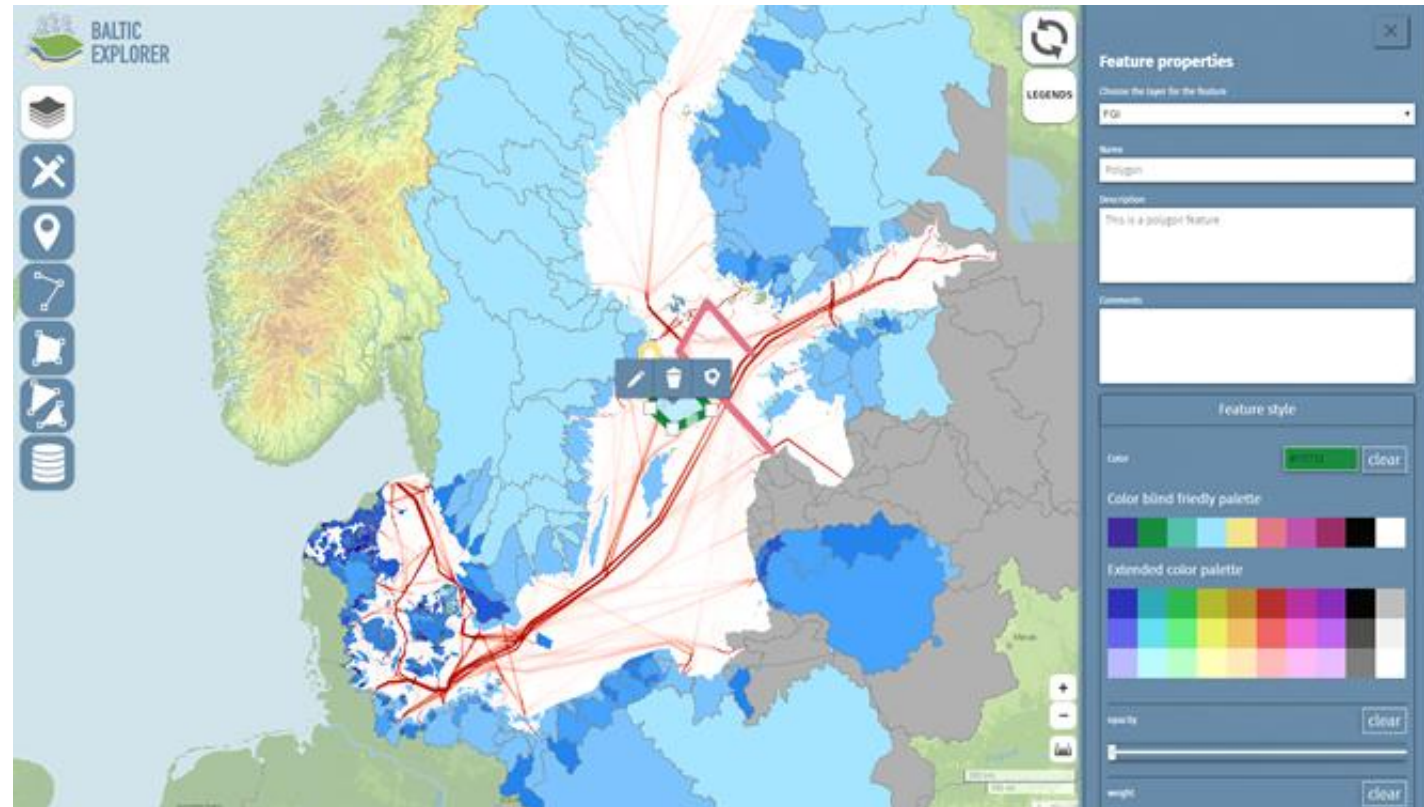
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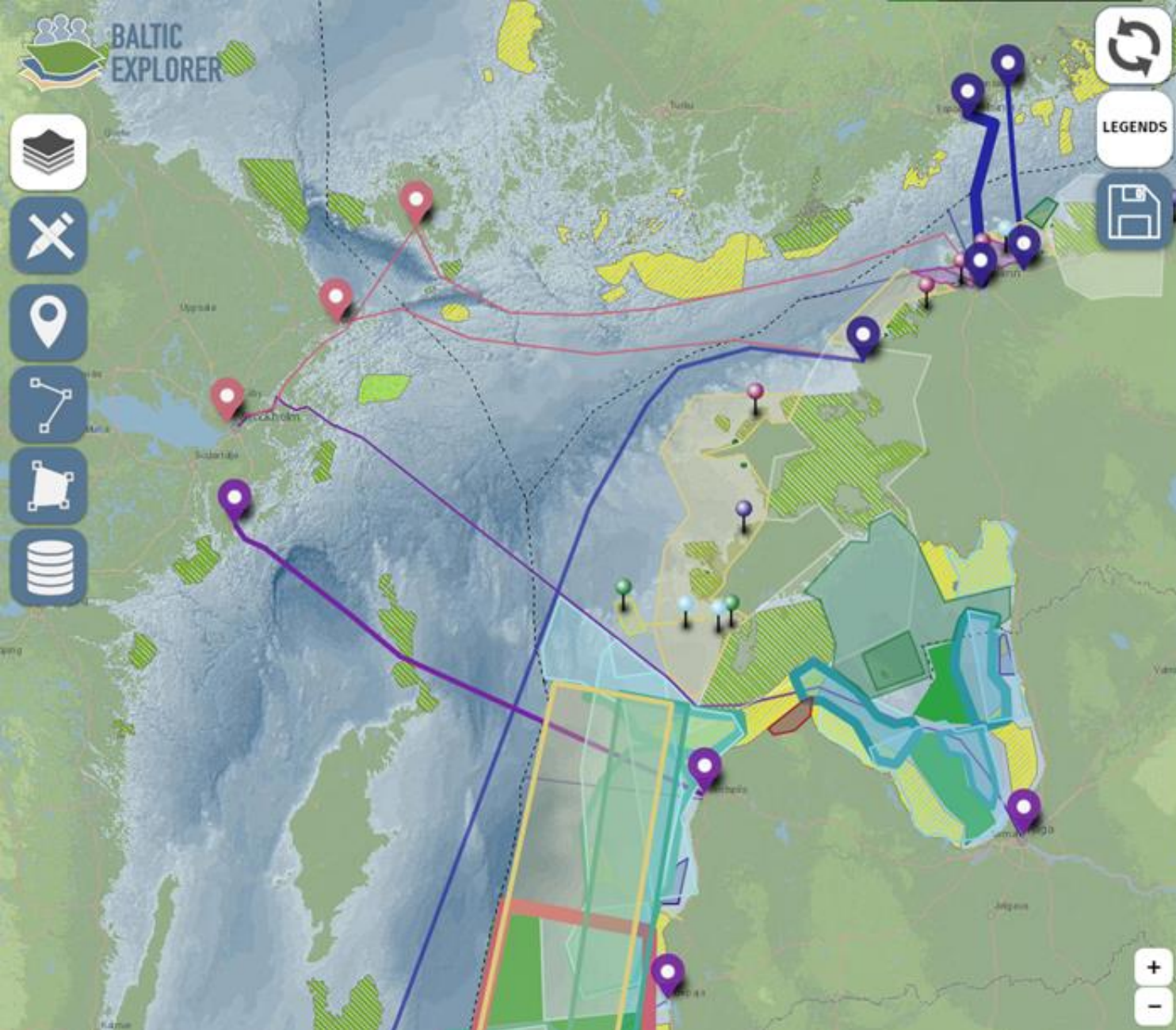
Design of Baltic Explorer



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- Designed for novice GIS users
 - web-based and responsive map interface for many display sizes.
 - no installation, flexibly available.
- Map-founded workspaces for multiple simultaneous users.
- Access to MSP-related spatial data from a variety of providers.
- Control over sharing, editing rights and workspace privacy.





Background maps

Features on the map:

- gu_mar464_estlat_envirnm (2).geojson
- MPA - no go area
- Natura 2000
- Seagrass meadow
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- Suggested MPA

Manage overlays

Overlay data on the map:

- UNESCO sites
- HELCOM MPAs
- Natura 2000 sites
- RM13 Global Climate Regulation (by carbon sequestration)
- Shellfish mariculture areas
- P2 Wild animals (Fish, pelagic- herring)
- Total commercial fisheries by gear type

Events of use and evaluation

(~100 participants, N=65 respondents)



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Place	MSP event	Organiser	Date	Participants	Project focus
Umeå, Sweden	MSP workshop “Better maritime planning – towards a shared future, together”	FIAXSE	26.3.2019	MSP planners and stakeholders	Usefulness of BE in MSP
Turku, Finland	PhD course “Maritime Spatial Planning processes in Baltic Sea countries”	University of Turku	6.-8.4.2019	Doctoral students	Usefulness of BE in MSP
Riga, Latvia	MSP workshop	Latvian Institute of Aquatic Ecology and the Latvian Ministry of Environmental Protection and Regional Development	20.2.2020	Ministry, regional authority and NGO personnel	Analysis functionality of the Latvian Case Study; Usefulness of BE in MSP
Online 1	University course “Maritime and Coastal Spatial Planning”	University of Turku	April 2020	Master’s students	Online use; usefulness of BE in MSP
Online 2	University course “Integrative governance of marine and coastal space: conditions, principles and toolbox”	University of Gothenburg	April-June 2020	Master’s students	Online use; usefulness of BE in MSP
Online 3	MSP workshop “Coastal and marine cultural heritage in the Baltic Sea – tourism, recreation and sustainability challenges”	Aalborg University Copenhagen	17.8.2020	Local NGO representatives and citizens with an interest in MSP	Online use; usefulness of BE in MSP

Evaluation results: Benefits of Baltic Explorer



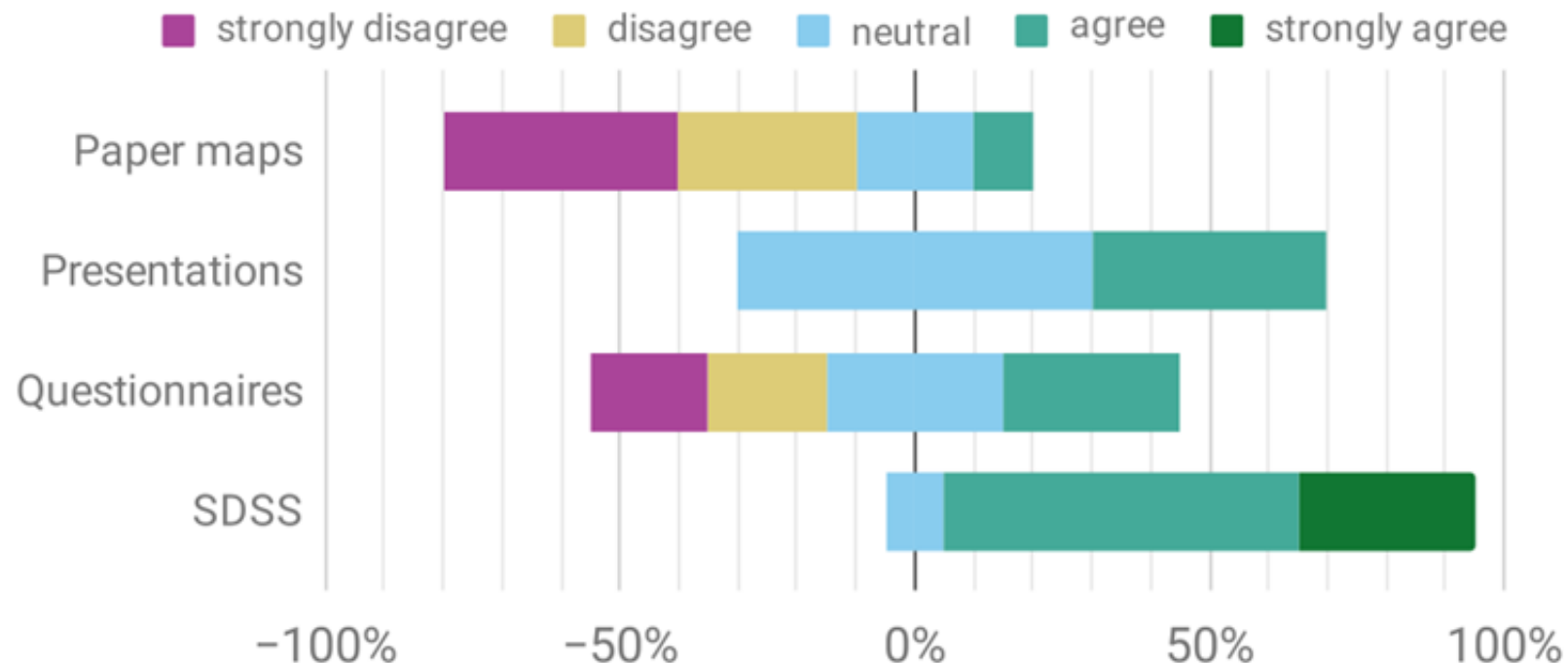
- MSP data available through SDIs
 - allows participants to explore data in as much detail as needed.
- The interactive nature of Baltic Explorer
 - offers participants means for joining to the discussion and collaborating together.
- UTU / ÅAU
 - parts of or even the whole MSP course can be organized as distance learning.
- UGOT
 - flexible enough for completing complex collaboration tasks.

Evaluation results: Issues in Baltic Explorer



- Usability
 - near real-time method of working appeared difficult in the beginning.
 - clearer editing rights were requested.
- Utility
 - drawing customization options are limited.
 - automatic saving of edited features were requested.
- Maps and data
 - background map offered by an SDI provider was not found detailed enough.
 - comparing and overlaying complex combinations of plan drafts was limited.

In the future, which of the following tools would you like to use in collaborative MSP work?



Spatial decision support systems, such as Baltic Explorer, were rated high by the respondents of the questionnaires. In the diagram, MSP course of the University of Gothenburg (n=10).

Resources



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<http://balticexplorer.eu>

Overview: <http://bonusbasmati.eu/about-the-project/baltic-explorer/>

Use concept film: <https://www.youtube.com/watch?v=daydYqgRjLQ>

User Guide: <http://balticexplorer.eu/static/umap/BalticExplorerUserGuide.pdf>

Source code: <https://github.com/FGI-GEOINFO/Baltic-Explorer>

Project deliverables and scientific publications: <https://bonusbasmati.eu/results-material/>

Selected publications



Rönneberg, M., Koski, C., Kettunen, P., and J. Oksanen, 2020. Enhancing interaction in maritime spatial planning workshops through collaborative GIS. *Abstracts of the ICA*, 2, 45. <https://doi.org/10.5194/ica-abs-2-45-2020>

Koski, C., Rönneberg, M., Kettunen, P., Eliassen, S., Hansen, H.S., and J. Oksanen, 2021. Utility of collaborative GIS for maritime spatial planning: Design and evaluation of Baltic Explorer. *Transactions in GIS*, tgis.12732. <https://doi.org/10.1111/tgis.12732>

Kettunen, P., Koski, C., Rönneberg, M., Oksanen, J., Hansen, H.S., and L. Schrøder, 2020. Baltic Explorer web-map and multi-touch application. *BONUS BASMATI Deliverable 5.5*, August 2020. <https://bonusbasmati.eu/results-material/deliverables/>

Thank you!



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