Contribution ID: **27** Type: **Talk**

Building Digital Twins of the Ocean

Thursday 4 April 2024 16:10 (15 minutes)

What are Digital Twins of the Ocean? Who does benefit from this data science tool? Which kind of new science can we address with them? How can we use Digital Twins to transfer knowledge and synthesise gains across research fields? Which building blocks of Digital Twins are required to step ahead? What can we build upon?

The term Digital Twins is a buzzword connected to many stakeholder interests. Yet, implementations of operational Digital Twins for Ocean Science remain scarce. While this method holds the potential to catalyse the cultural change towards Open Science, fundamental technical challenges remain to be solved. At this very moment, initiatives like the DataHub, HMC and HMC projects or data space designers like the NFDIs, EOSC and GAIA-X all contribute puzzle pieces towards building the interoperable and FAIR systems required for operational Digital Twins of the Ocean. Often without specifically targeting Digital Twin methods as a goal.

In this contribution, the puzzle pieces will be placed on a larger canvas, showing connections, gaps, risks and potentials. A roadmap towards interoperable and FAIR marine data spaces and transfer actions will be sketched along the GEOMAR strategy towards facilitating Digital Twins of the Ocean as one tool of future marine science.

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Session Classification: Session 2: Data Quality and HPC for Data Science

Track Classification: Data Quality and HPC for Data Science