Benefits and needs of a marine carbon indicator

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Overarching need

Price of CO$_2$ in the EU Emissions Trading System

Source: https://en.wikipedia.org/wiki/European_Union_Emission_Trading_Scheme

Source: https://www.sustainableislandsplatform.org/about/blue-economy/

Source: https://www.zmescience.com/other/feature-post/what-is-paris-agreement/
Fate of anthropogenic CO$_2$ emissions (2009–2018)

**Sources**

34.7 GtCO$_2$/yr  
86%

14%

5.5 GtCO$_2$/yr

**Sinks**

17.9 GtCO$_2$/yr  
44%

29%

11.5 GtCO$_2$/yr

23%

9.2 GtCO$_2$/yr

**Budget Imbalance:**

(the difference between estimated sources & sinks)

4%

1.6 GtCO$_2$/yr

Source: CDIAC, NOAA-ESRL, Houghton and Nassikas 2017; Hansis et al 2015; Friedlingstein et al 2019; Global Carbon Budget 2019

=residual
Using the current price set by the European Union Emissions Trading System (EU ETS) of 30.13 Euros/per tonne CO₂ (December 2020) resulting in a value of the ocean sink at 277.2 billion Euros per year.

If we reduce the emissions of CO₂ or improve geoengineering as a result of the Paris agreement– we need to be able to monitor the impacts.
Understanding the impact of Ocean Acidification for the Blue Economy

- Changes in acidity have a direct impact on shellfish farming industry (example shell fish farms in North and South America)
- Direct impact on marine food chains -> fisheries
- Need for a European OA early warning system for Blue Economy as under development by NOAA, USA

Source: https://www.oceanacidification.org.uk
Societal impact

14.3 Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels.

Ocean acidification was highlighted by the G7.
Future possible services

FluxEngine air–sea gas flux toolbox from Holding, Shutler et al, Ocean Sciences, 2019

Better quantification of the ocean sink

European OA early warning system app
Current challenges

(Ferguson et al., 2014, Nature)

International marine carbon data flow is mature and just becoming ready for higher level services

Data access via numerous entities -> lack of reported uncertainties
Marine carbon indicator

- Steps: integrating data via interoperable services, recomputation of missing EOV Inorganic Carbon sub-variables*, provision of uncertainties*
- Harmonised data access is the baseline for future applications and services
- Make data Fit for Purpose

Data access and integration via ERDDAP

Data value chain

Work progress:
- Harmonisation
- Recomputation of sub-variables*
- Uncertainties provision*
  *where possible due to data provision

Output:
- Harmonised integrated carbon indicator providing state of the art data access, uncertainties, sub-variables of the EOV Inorganic Carbon

Impact:
- SDG 14.3
- Global Carbon Project
- Policy makers
- Stake holders

* Where possible due to data availability
Thank you!

Feel free to send mails to benjamin.pfeil@uib.no for further questions or discussions