EGU General Assembly 2019

Assessing the economic impacts of Environmental Research Infrastructures: Overview of methodological tools

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Content

- Significance of Environmental Research Infrastructures for EU research and science
- Value of an ENV-RI: economic impacts and performance
- Case study: Euro-Argo

Significance of ENV-RIs for EU research

- Environment analysis & forecast = critical ➔ need for ENV-RIs
- In-situ observing system + sensors on board satellites
- ENV-RIs ➔ technology mix

- ENVRI PLUS (H2020) 2015-2019
  - All Earth system science domains
  - Atmosphere, marine, biosphere, solid Earth
  - Partnership: 20 RIs + 7 associated RIs

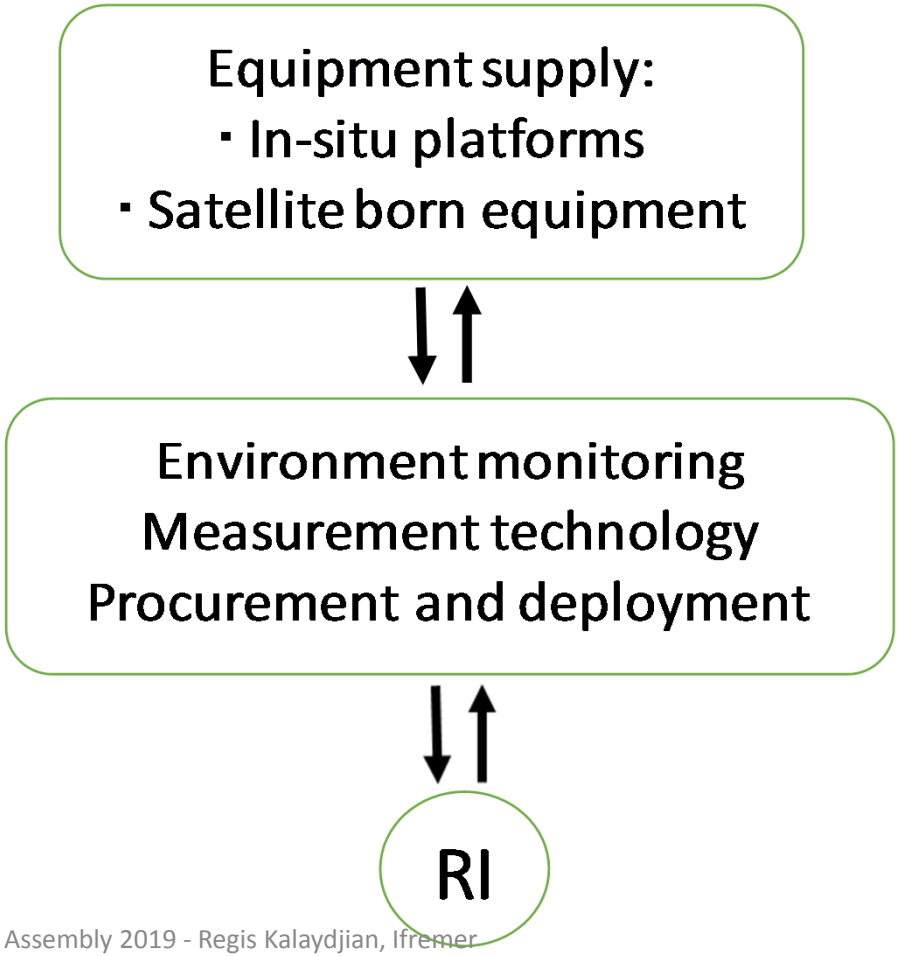
Economic impacts of ENV-RIs

- Valuation of ENV-RI impacts
- Costs = investment costs + running costs
- Benefits for society & local communities

- Upstream impacts = impacts on suppliers
- Downstream impacts = impacts on data users and processors
- Feedback impacts = environmental damage prevention and mitigation

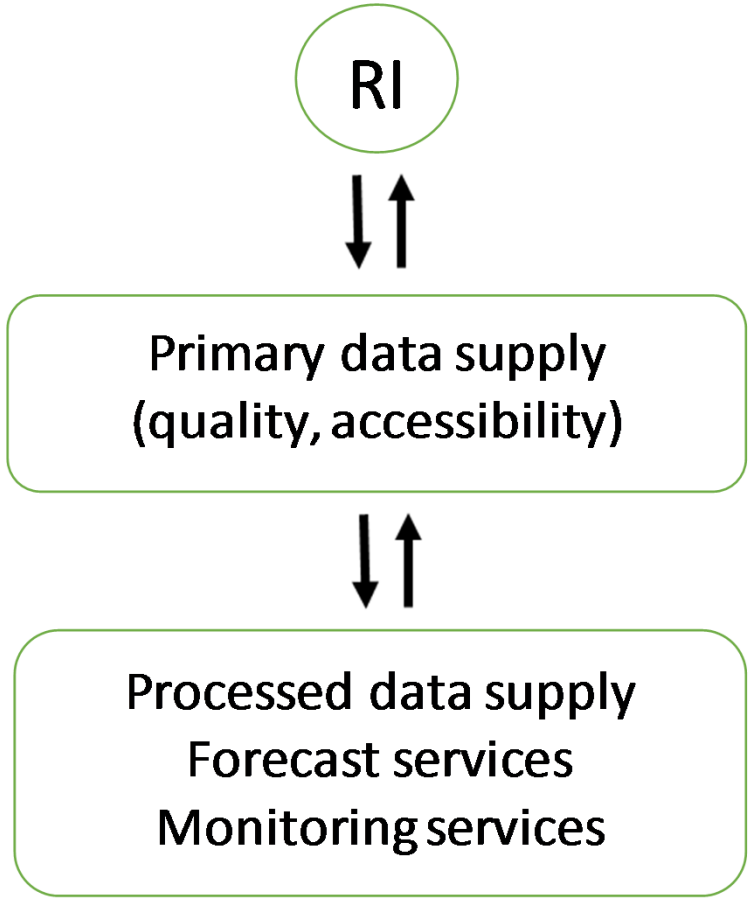
Economic impacts of ENV-RIs

- Upstream impacts



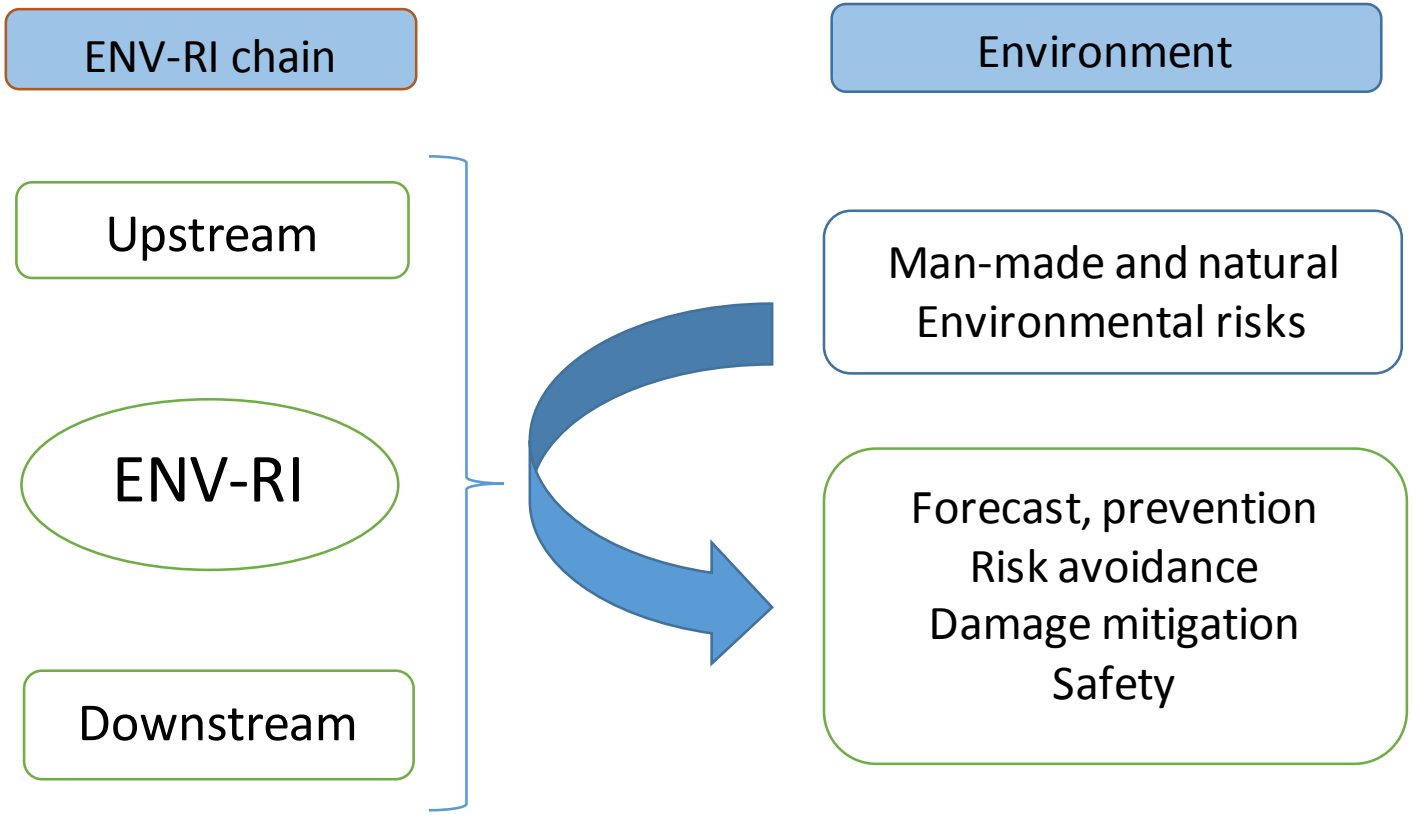
Economic impacts of ENV-RIs

- Downstream impacts



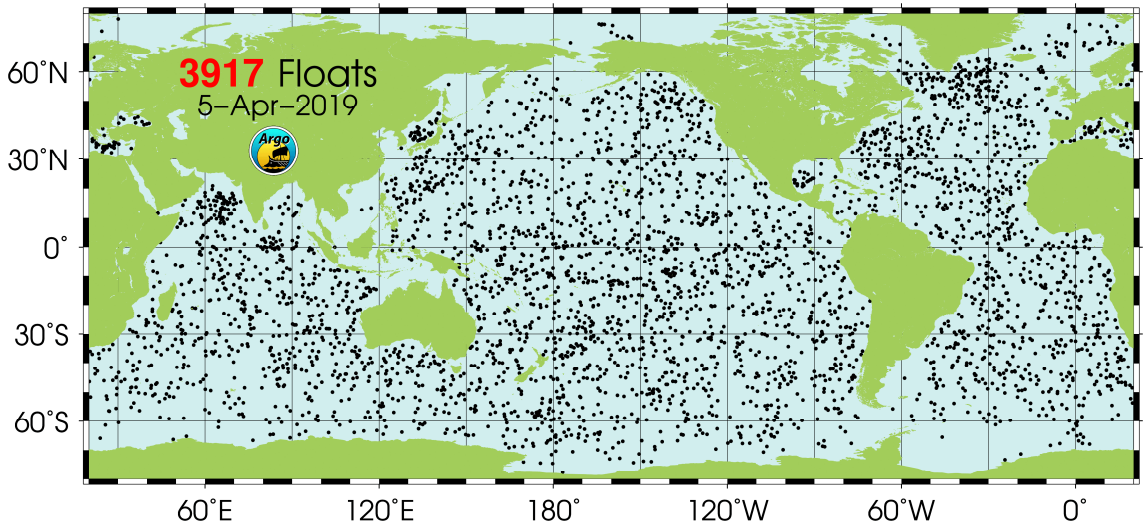
Economic impacts of ENV-RIs

- Feedback impacts

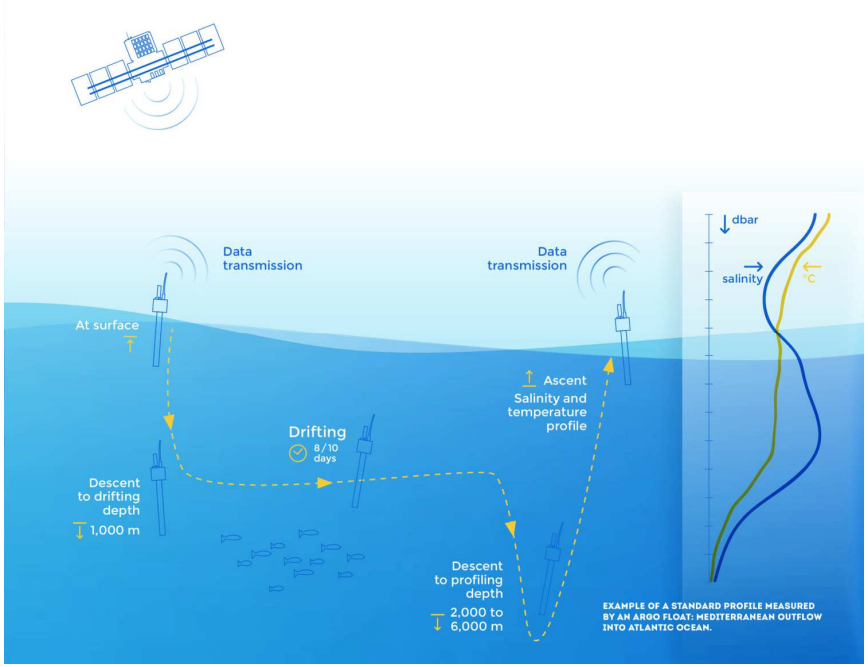


Case study: Euro-Argo

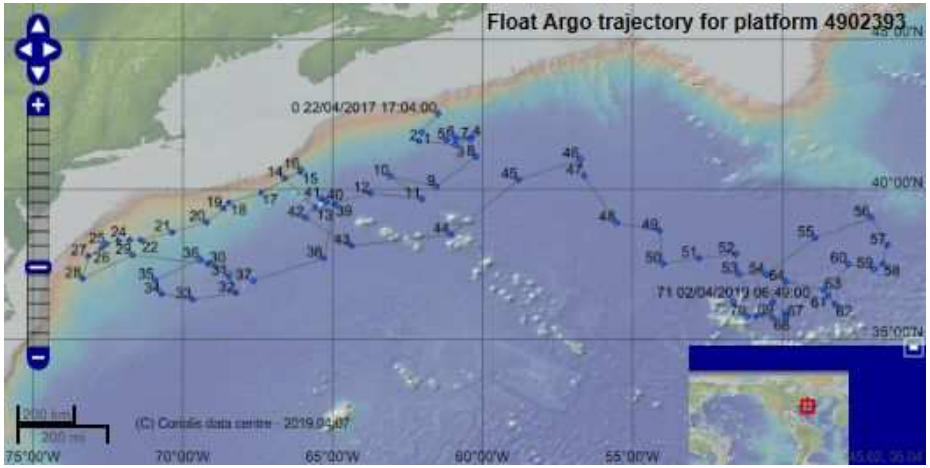
- Argo & Euro-Argo
- Global array of floats ➔ T, S, …

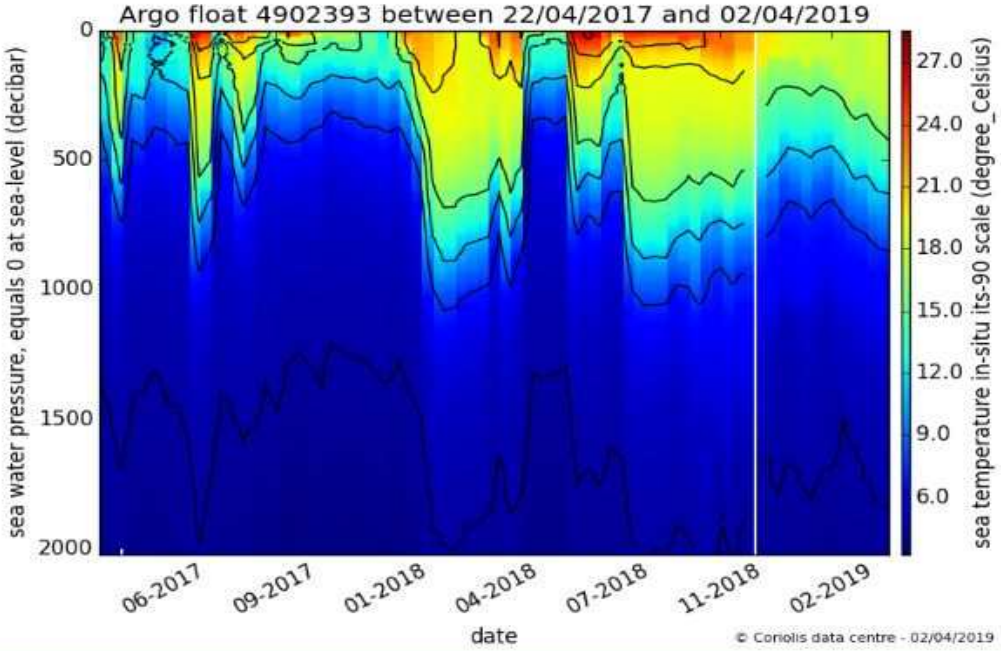


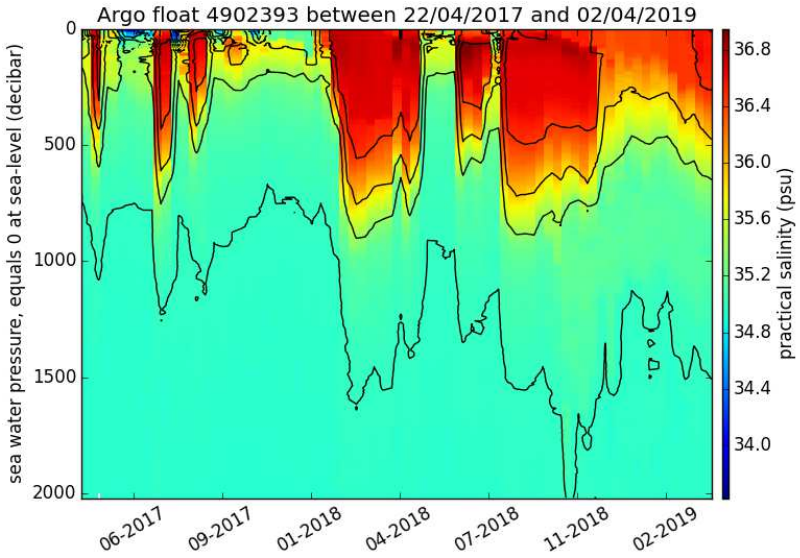
Case study: Euro-Argo



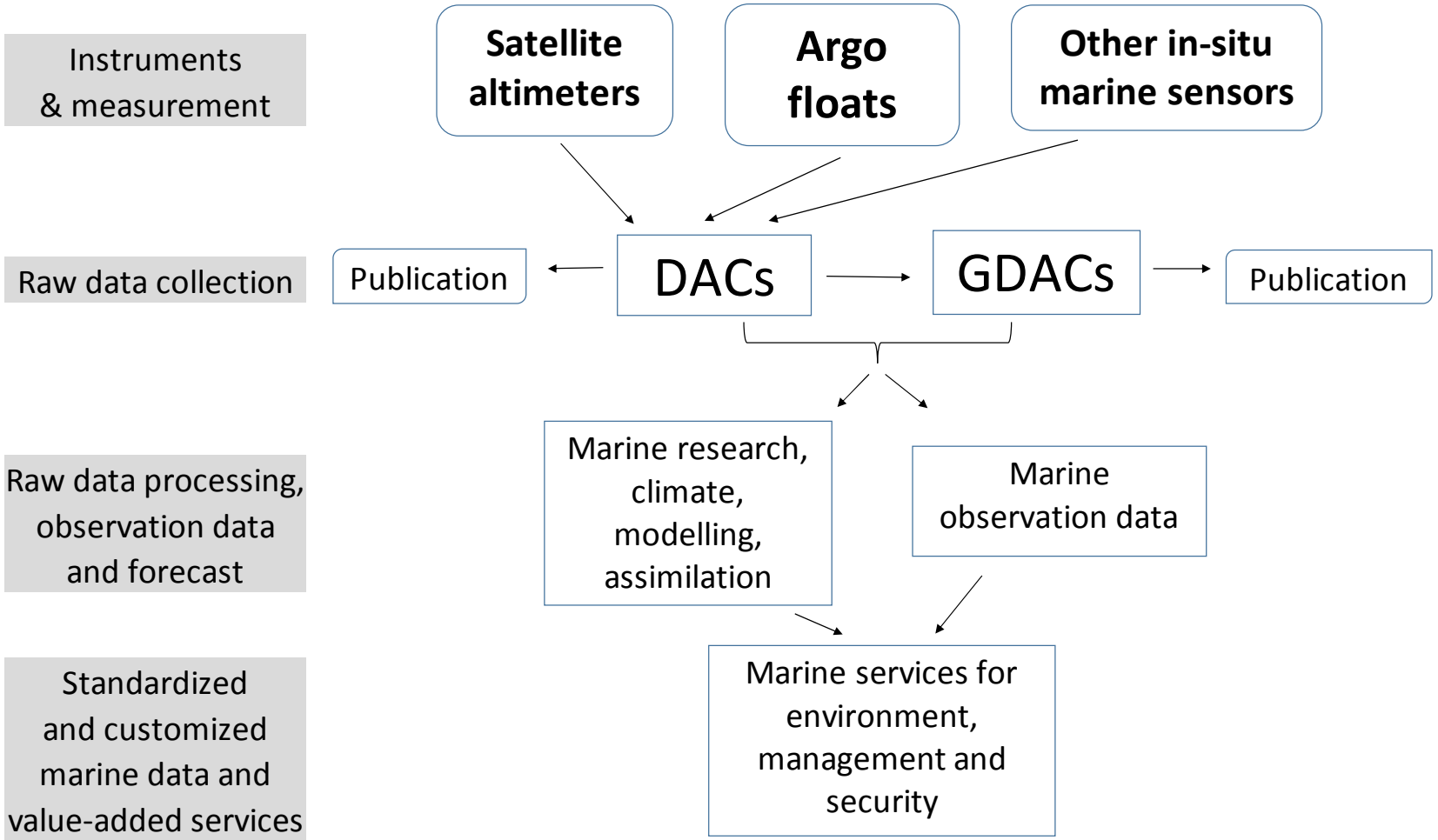
Case study: Euro-Argo







Euro-Argo supply chain



Economic valuation: upstream impacts

Objective:
Assess impacts of ENV-RI development
In terms of:
Suppliers' production
Suppliers' jobs

→

Tools and Methodology:
1/ Analyse suppliers
(Using survey and official statistics)
2/ Analyse ENV-RI demand
(Using National Accounts)

→

Euro-Argo:
Identify suppliers
Inventory of demand

Economic valuation: downstream impacts

Objective:
Assess ENV-RI performance for:

- Primary data collection
- Data processing, assimilation & forecast

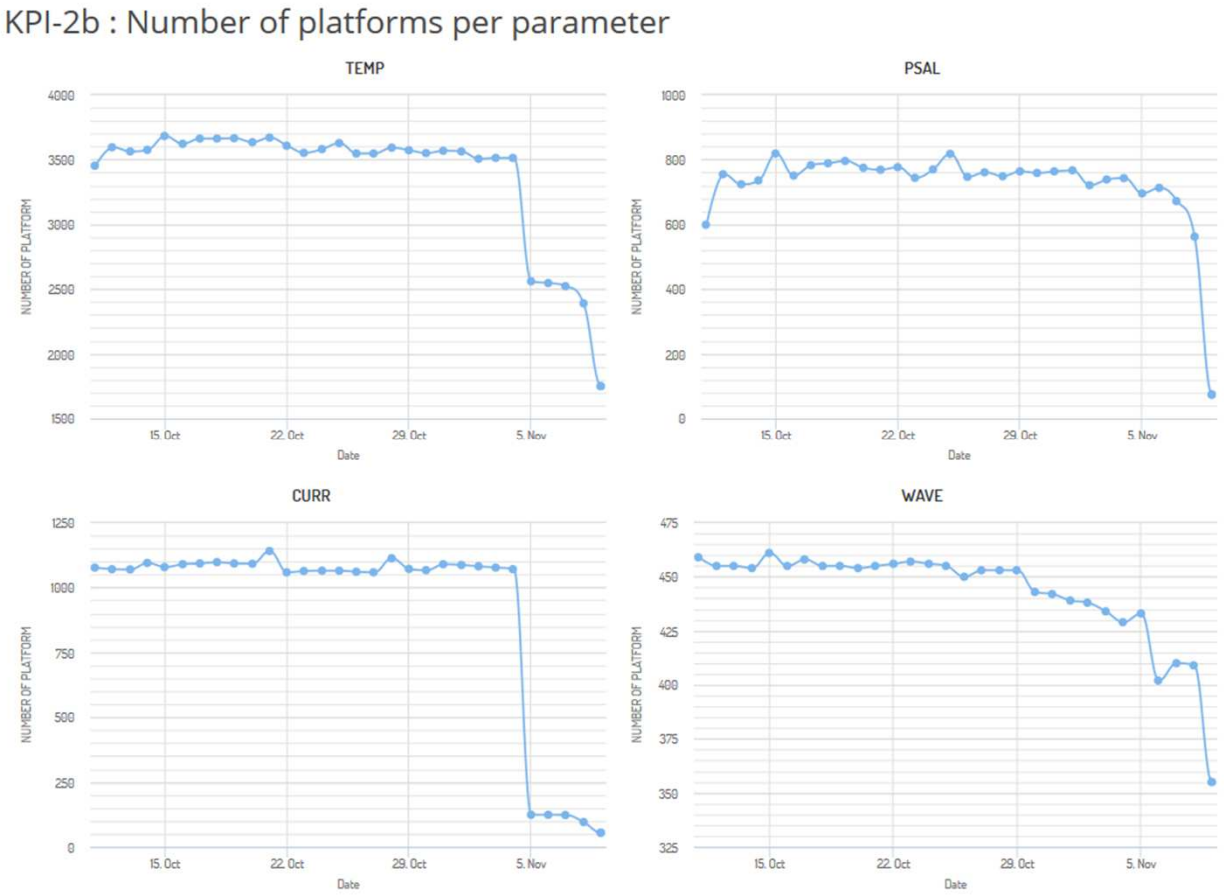
Tools and methodology:

- KPIs → data collection performance
- OSEs → forecast performance

Euro-Argo:

- KPIs ← Coriolis
- OSEs ← E-AIMS and others

Euro-Argo: example of KPI from Coriolis



Example of OSE

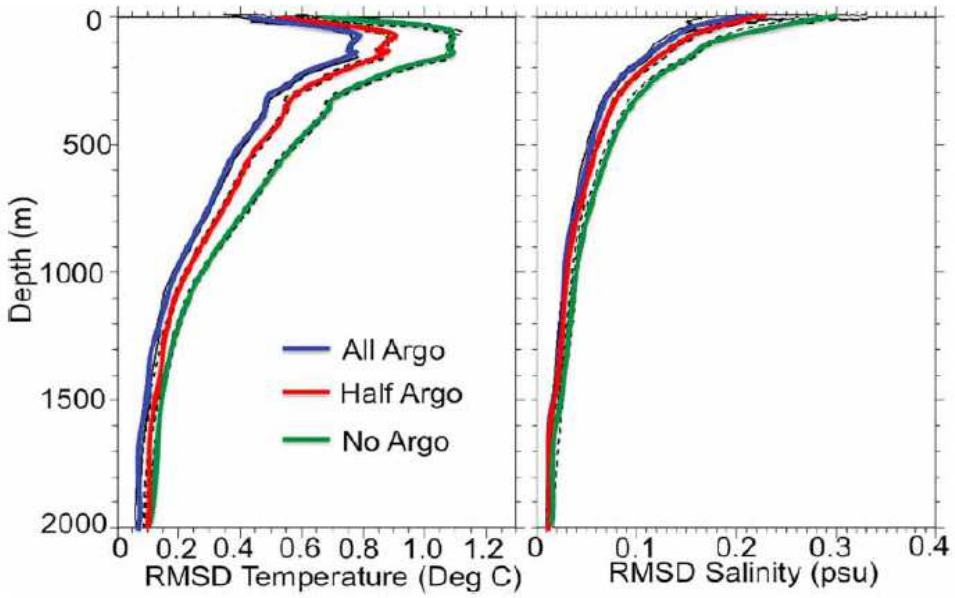
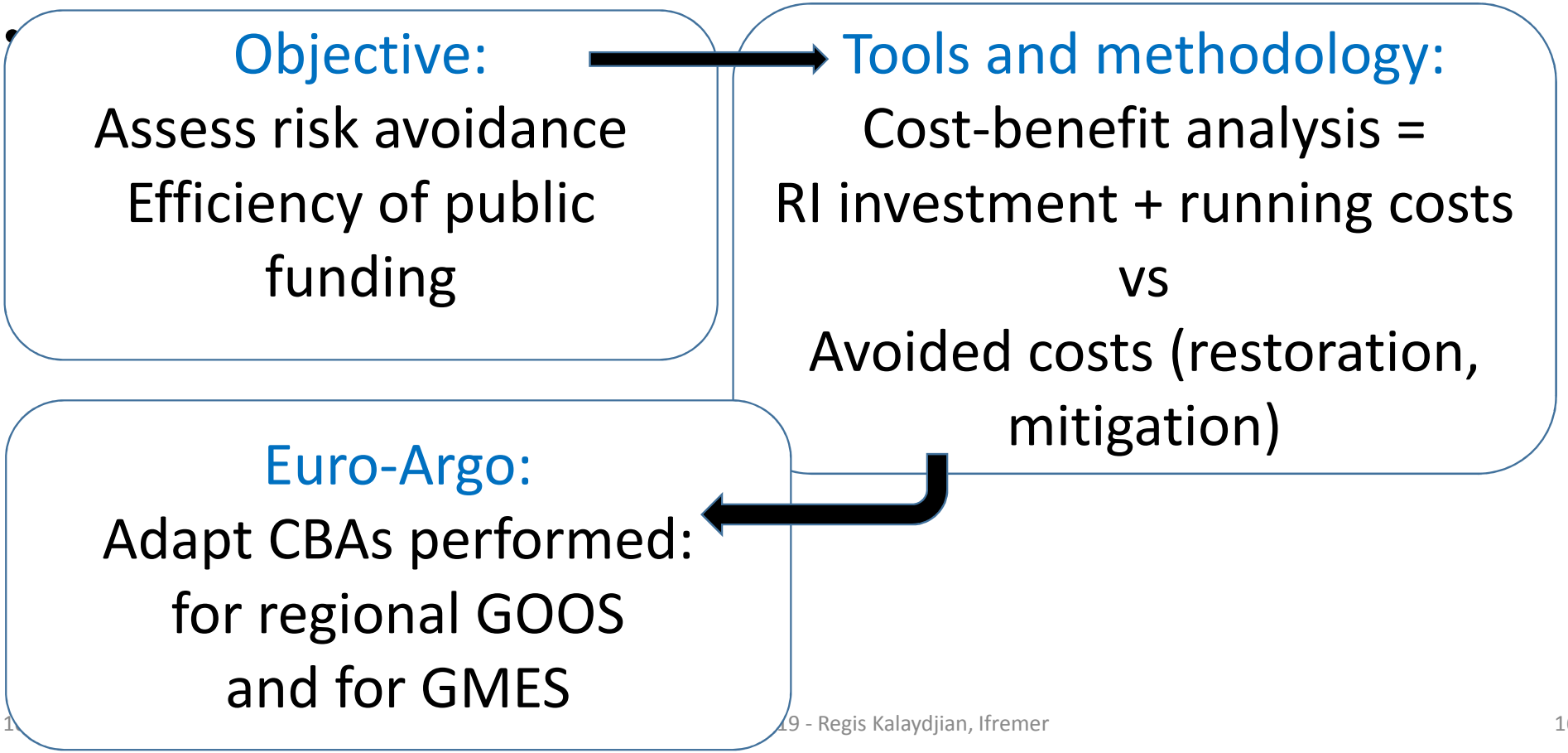


Figure 1. Global mean root-mean-squared difference (RMSD; OmB) profile for 2012 in temperature (left) and salinity (right): in the Mercator run assimilating all Argo floats, half Argo floats, and no Argo floats.

Extracted from: P.R. Oke, G. Larnicol, Y. Fujii, G.C. Smith, D.J. Lea, S. Guinehut, E. Remy, M. Alonso Balmaseda, T. Rykova, D. Surcel-Colan, M.J. Martin, A.A. Sellar, S. Mulet & V. Turpin (2015) Assessing the impact of observations on ocean forecasts and reanalyses: Part 1, Global studies, Journal of Operational Oceanography, 8:sup1, s49-s62, DOI: 10.1080/1755876X.2015.1022067

Economic valuation: feedback impacts



InterRisk: avoided costs for oil spill (Erika)

Estimates (€)	Damage cost	Avoided cost rate	Avoided cost
Coastline response	32 m	10%	3 m
Waste treatment	80 m	15%	8 m
Coastal fisheries	26 m	5%	1.3 m
Aquaculture	17.5 m	5%	0.9 m
Salt production	14 m	25%	3.5 m
Property damage	2.6 m	5%	0.1 m
Coastal tourism	280 m	10%	28 m
Secondary losses	1 m	5%	-
TOTAL	453.1		44.8 m

Conclusion

- Specific methods for upstream, downstream and feedback impacts
- Euro-Argo:
  - Need for longer time series to get relevant indicators
  - Use of a "metrics mix" combining economic indicators and non-monetary proxies
- Need for more case studies to check that methodology is relevant for all ENV-RIs
- Adapt assessment method to evolving ENV-RIs and experience