

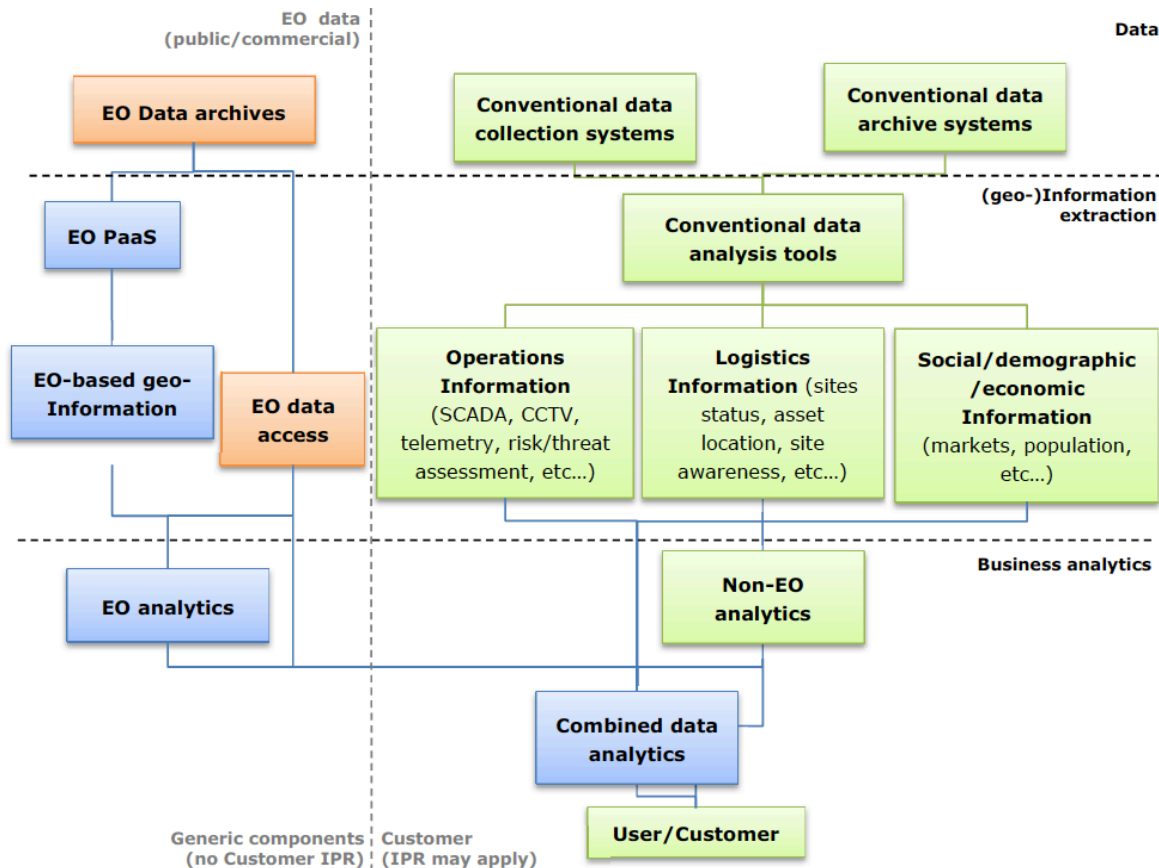
# Future EO-1 and Resilience

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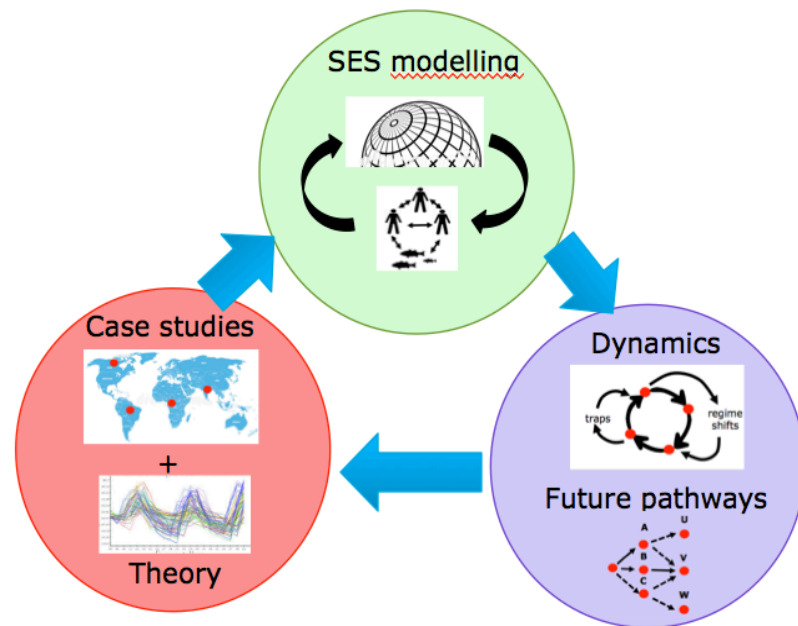
# Underlying themes for Future EO-1 applications

- Embed EO into operational working practices
- Extend basic EO to effectively integrate in-situ data, models etc using platform capabilities
- Embrace AI capabilities (not just pattern recognition)
- Exploit cloud architectures, access to HPC resources



# Future EO1 elements – EO for Resilience

Figure II: The Global Risks Landscape 2020



# EO for Resilience – proposed implementation approach



## Priority components to be addressed:

- Environmental and public health resilience (eg ecosystem functionality, health, geophysical risk, availability of natural resources)
- Socio-economic resilience (eg access to natural resources, availability of infrastructure, economic resilience to fast and slow perturbations)

## Enable:

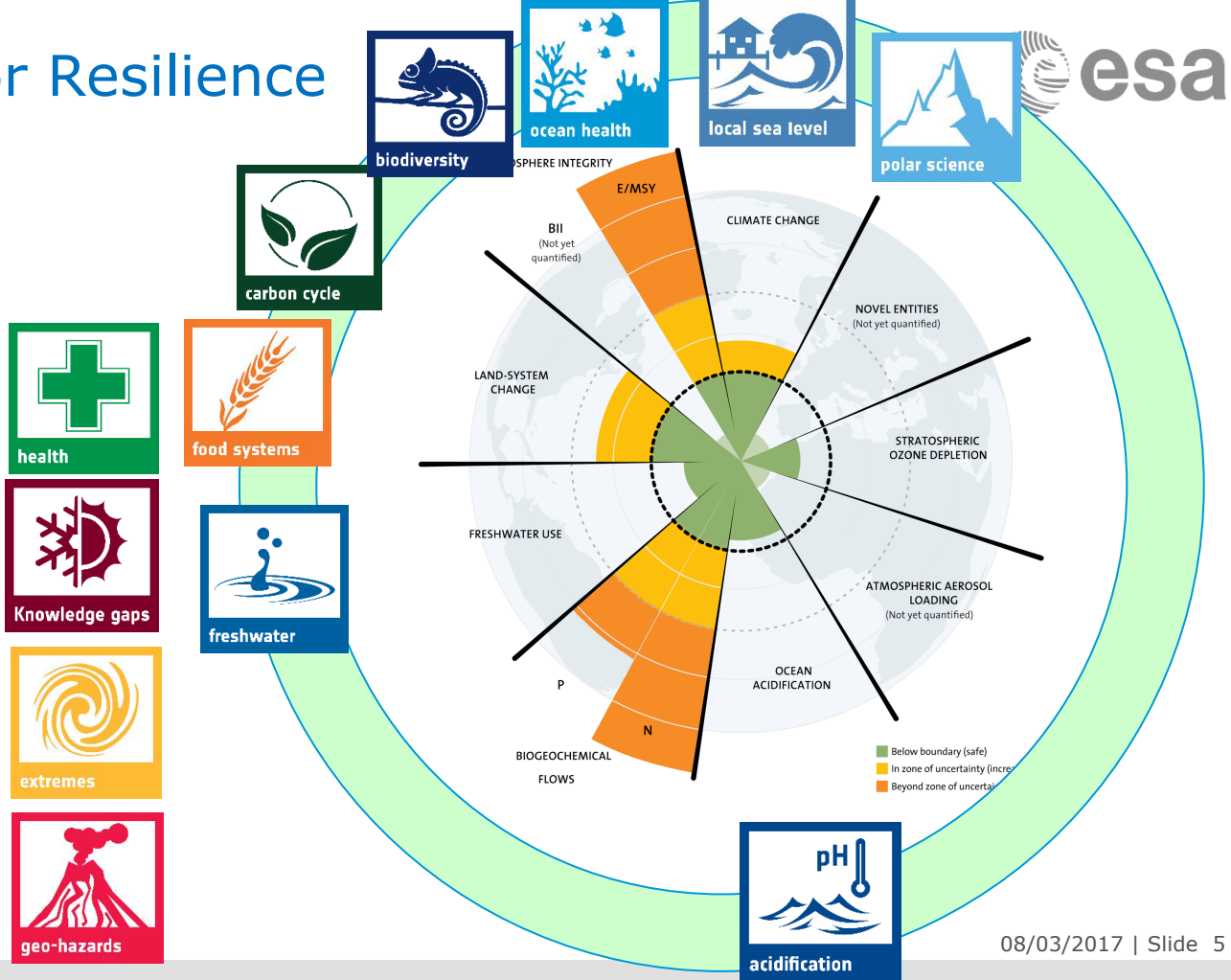
- detection of onset of regime shifts linked to slow perturbations (eg sea level, coastal erosion, land degradation)
- understanding changing resilience to short time scale external shocks (disasters, shocks etc)
- Characterize human-ecosystem interactions and feedbacks on short and long timescales

## Proposed developments:

- Engage Stakeholders - consultation and partnership, develop a science roadmap
- EO based information layers to support all levels of process characterization
- Build on on-going science developments (ecosystems etc)
- Development and testing of AI based algorithms and associated training datasets Development and verification of hybrid conventional/AI models
- Link to existing (and augmented) in-situ data and conventional models
- Develop underlying platform infrastructure to enable effective links to/processing of required datasets and models

# Evolving context for Resilience

- ESA-DG RTD cooperation agreed for coordinated approach to priority science clusters
- Developments in each cluster will:
  - Strengthen scientific characterization of key processes and interactions
  - Develop and make available key data sets and information layers and support more comprehensive modelling





# Planned activities in 2020



## EO4Resilience

One tender to initiate separate activities in each of the following domains:

- Urban resilience
- Public health resilience
- Ecosystem resilience

In parallel a single tender to support national statistical offices integrate EO into statistical analysis approaches linked to resilience related issues

## Science Grand Challenges

- Polar Science Gaps
- Regional sea level and coastal hazards precursor
- Climate extremes
- Biodiversity precursor
- Ocean health precursor
- Science Cluster consolidation - initially addressing Polar, Ocean and Carbon Science Clusters

# Conclusions



- Resilience concepts are increasingly central to ESA EO exploitation activities
- This fosters a range of development domains including new data, data enhancement, data fusion, diverse AI capabilities, assimilation, enhanced modelling, customized analytics capabilities and visualization
- The two main lines of action are EO4Resilience and Science Grand Challenges but related developments will also be implemented under:
  - Regional Initiatives
  - EO4Security
- Resilience considerations will also be a major driver for Digital Twin Earth related developments

# Thanks for your attention

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