AI4EO Earth Science

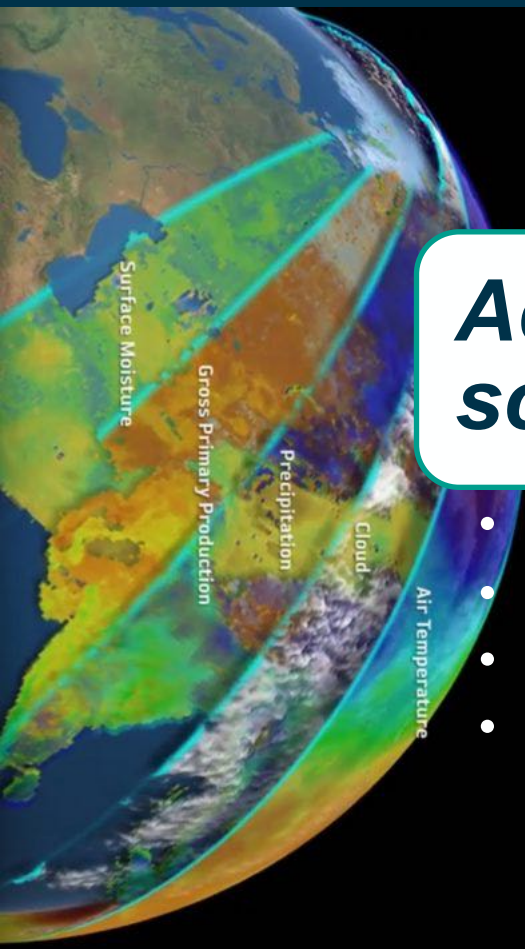
Anca Anghelea, March 2021,

Earth Observation Info Days 2021

AI for EO – Earth Science

Recommendations from Phiweek 2020

AI for understanding processes in intertwined Earth System Dynamics → report available at phiweek.esa.int



Advance AI as a tool for Earth system science

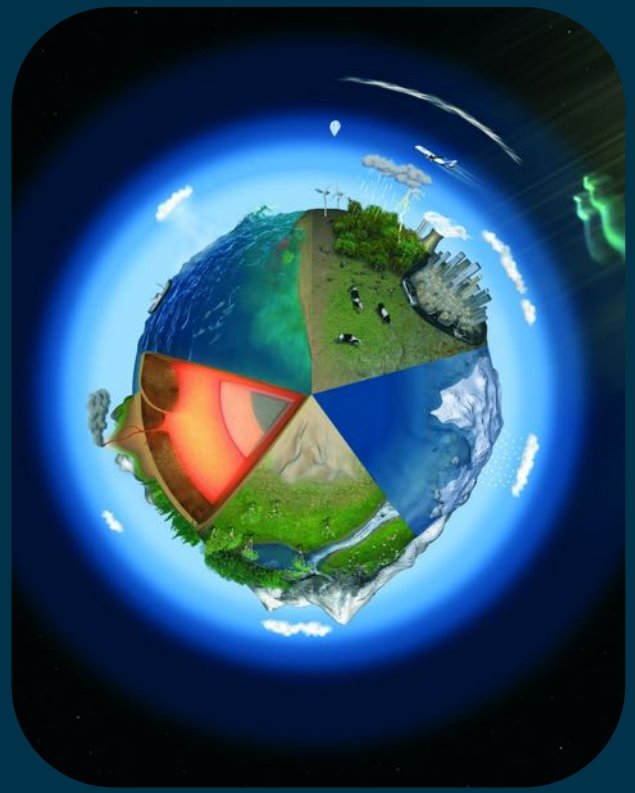
- Equip ESS against naive applications of AI methods → interpretability (XAI)
- Learn from AI what you don't know from first principles → hybrid modelling
- Causal inference from Earth observations
- Explore the potential of AI for enhancing EO-based products

ITTs – Upcoming opportunities

- AI4Science – Open Call for Proposals (Q1 2021)
- Deep Earth System Data Lab – (Q2 2021)
- AI4Climate Adaptation and Natural Disasters – Extreme Events (Q3 2021)
- MOOC – Earth Observation for Computer Scientists (Q4 2021)

AI4Science – Open Call for Proposals

Following the Phi-week 2020 community recommendations, this activity aims at exploring and advancing the use of AI for Earth system science.
Budget: 1.2 MEUR Note: Q1 2021



AI4 Time Series

- Development of AI methods and algorithms for learning from incomplete and sparse multi-variate multi-temporal observations

EO data-driven Earth process description

- Develop AI based approaches for synergic exploitation of highly diverse EO data and products to reveal latent physical variables that are not directly observable or measurable through current remote sensing techniques

AI4 interactions between social and ecological systems

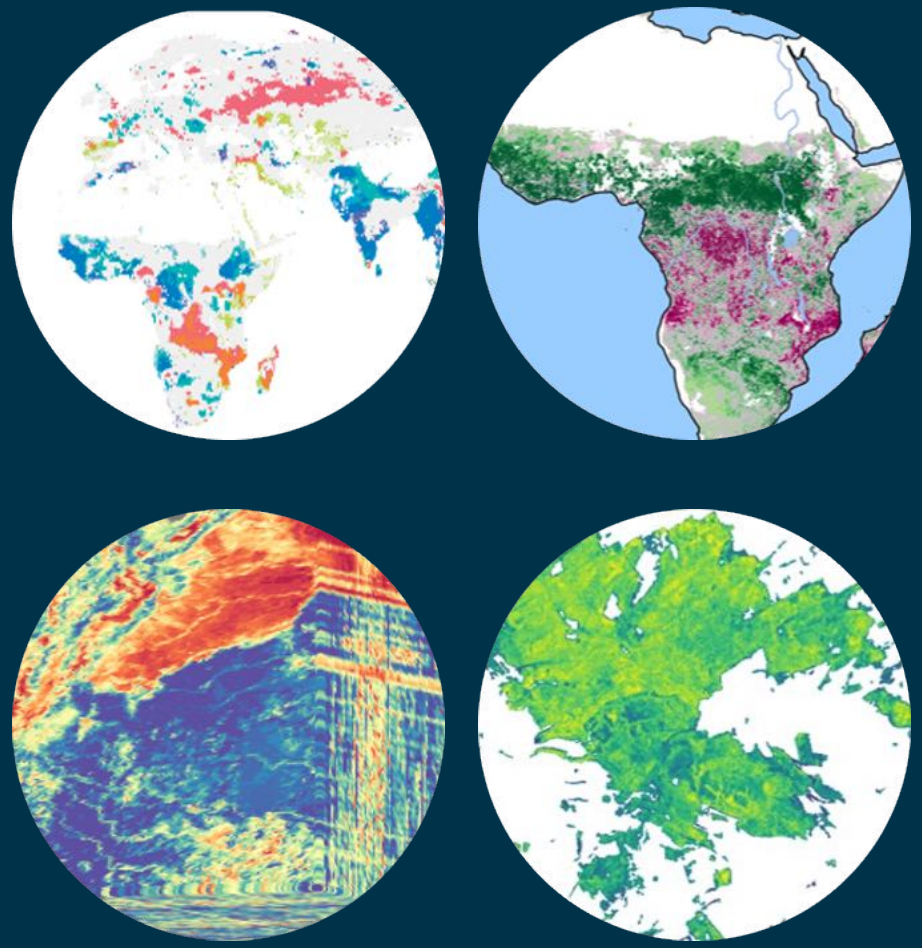
- Develop methods for learning and characterising the complex interactions and feedbacks across physics, biochemistry and ecosystem functioning, accounting for the human interactions

Deep ESDL

An evolution of the Earth System data Lab to:

- Facilitate discovery and access to a comprehensive collection of Earth System variables → expand data offering for ESA Science Clusters
- Permit collaborative design and development of AI workflows, data and model evaluation and benchmarking, model versioning
- Allow for seamless visualisation, publishing and dissemination of results

Budget: ~1 Million Euro
ITT issued: Q2 2020

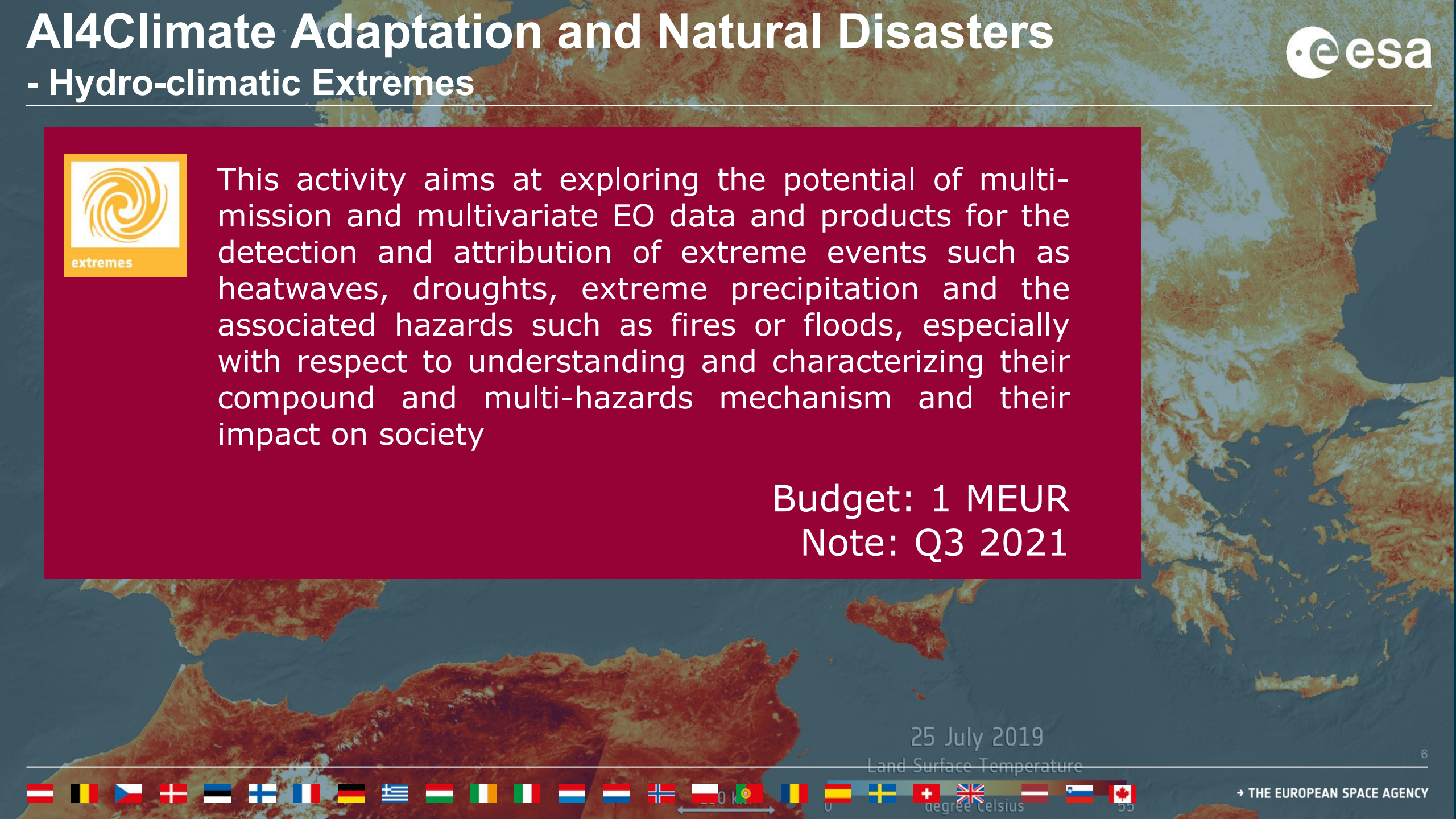


AI4Climate Adaptation and Natural Disasters
- Hydro-climatic Extremes

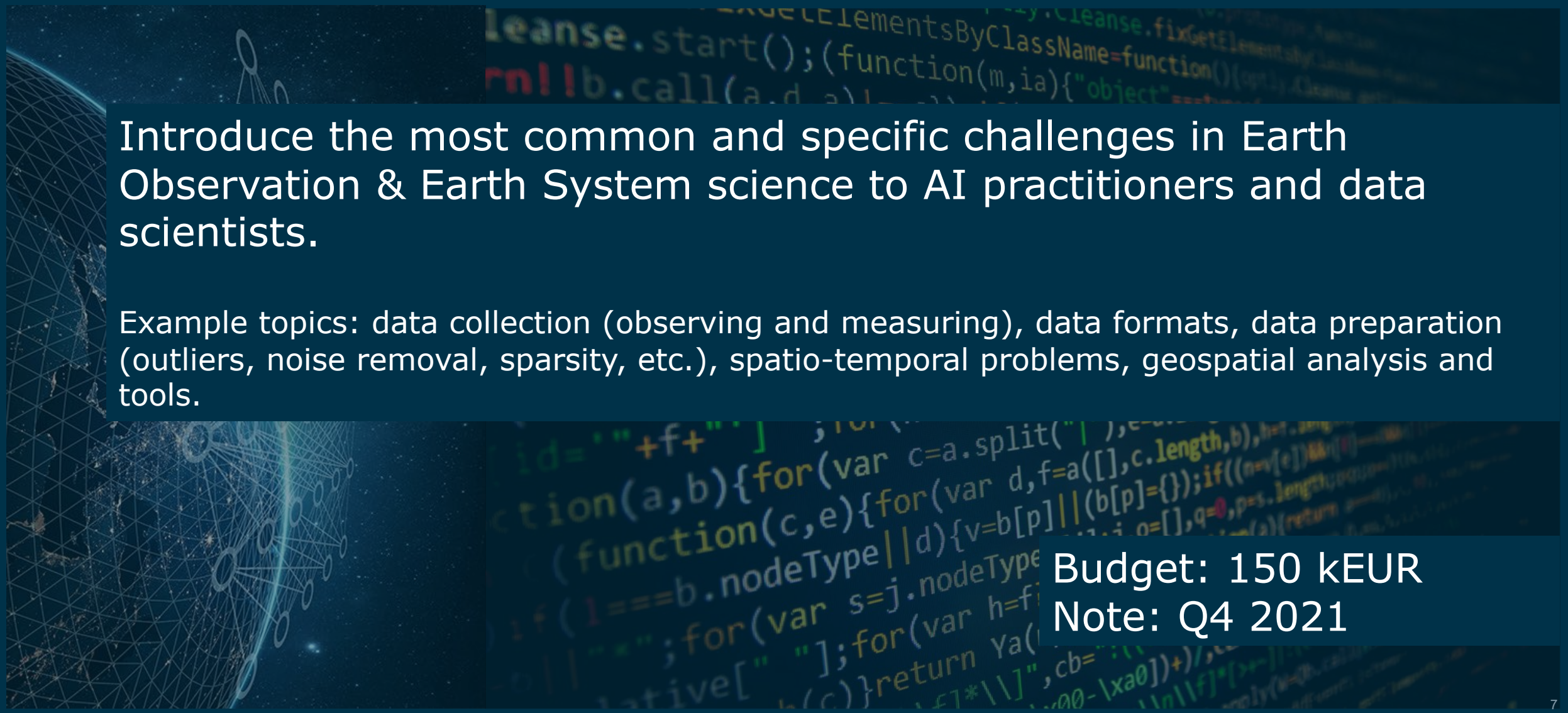
extremes

This activity aims at exploring the potential of multi-mission and multivariate EO data and products for the detection and attribution of extreme events such as heatwaves, droughts, extreme precipitation and the associated hazards such as fires or floods, especially with respect to understanding and characterizing their compound and multi-hazards mechanism and their impact on society

Budget: 1 MEUR
Note: Q3 2021



MOOC – Earth Observation for Computer Scientists



Introduce the most common and specific challenges in Earth Observation & Earth System science to AI practitioners and data scientists.

Example topics: data collection (observing and measuring), data formats, data preparation (outliers, noise removal, sparsity, etc.), spatio-temporal problems, geospatial analysis and tools.

Budget: 150 kEUR
Note: Q4 2021