

Foreshore Assessment using Space Technology

Daphne van der Wal¹, Tjeerd J. Bouma¹, Edward P. Morris², Jesus Gomez Enri³, Gloria Peralta³, Javier Benavente³, Mindert de Vries⁴, Bregje van Wesenbeeck⁴, Gerrit Hendriksen⁴, Iris Möller⁵, Tom Spencer⁵, Adrian Stanica⁶, Geoff Smith⁷

1. Royal Netherlands Institute for Sea Research, Yerseke, The Netherlands / 2. Instituto de Ciencias Marinas de Andalucía (ICMAN-CSIC), Puerto Real, Spain / 3. Faculty of Marine and Environmental Sciences, University of Cadiz, Puerto Real, Spain / 4. Deltares, Delft, The Netherlands / 5. Cambridge Coastal Research Unit, University of Cambridge, Cambridge, UK / 6. National Institute for Marine Geology and Geo-ecology (GeoEcoMar), Bucharest, Romania / 7. Specto Natura Ltd., Cambridge, UK



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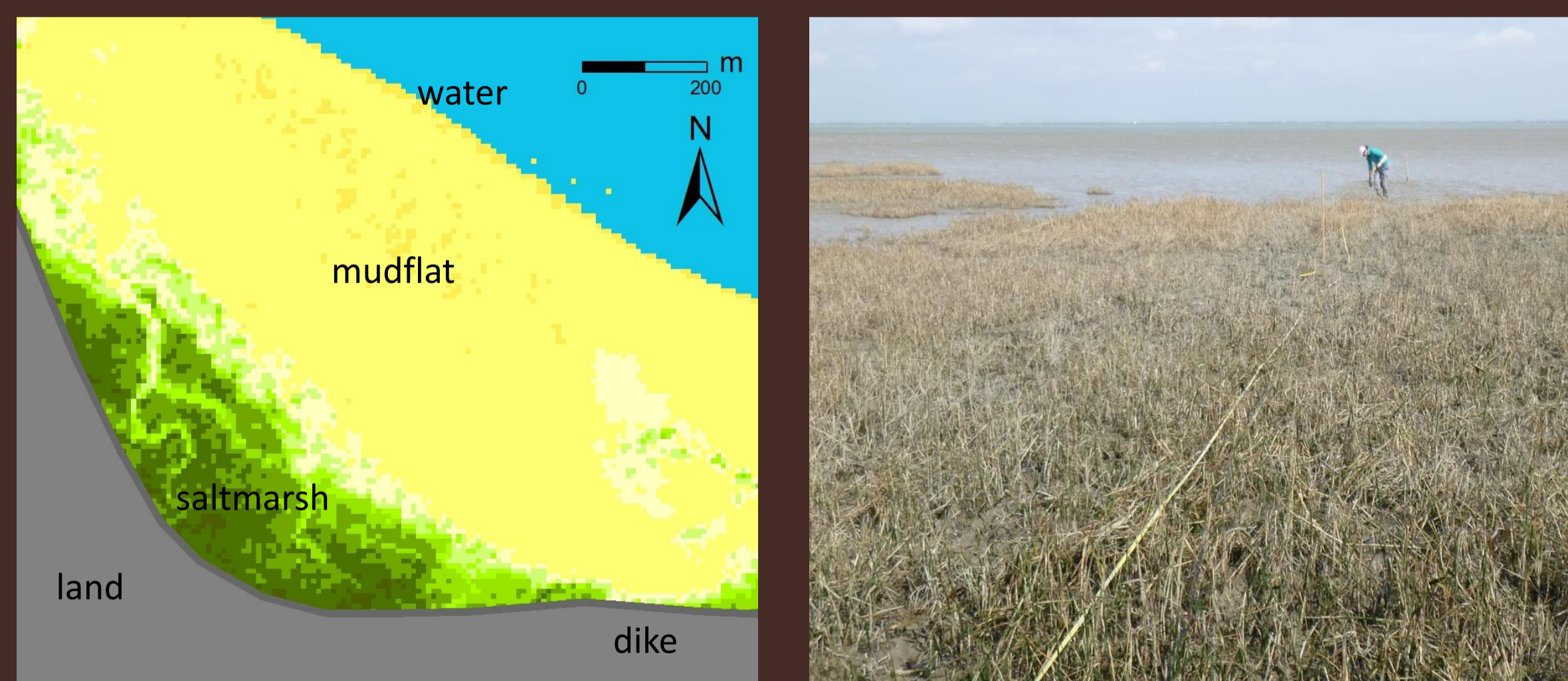
Introduction

Vegetated foreshores and floodplains are ecological important ecosystems along the European coast. They also offer benefits for coastal defence, as they attenuate waves, enhance sedimentation and reduce erosion. The EU-funded project FAST (2014-2018) aims to understand and predict the attenuating effects and stability of vegetated foreshores, and develop a Copernicus downstream service based on Sentinel data for integrating the buffering function of such foreshores into flood risk management strategies and levee design.

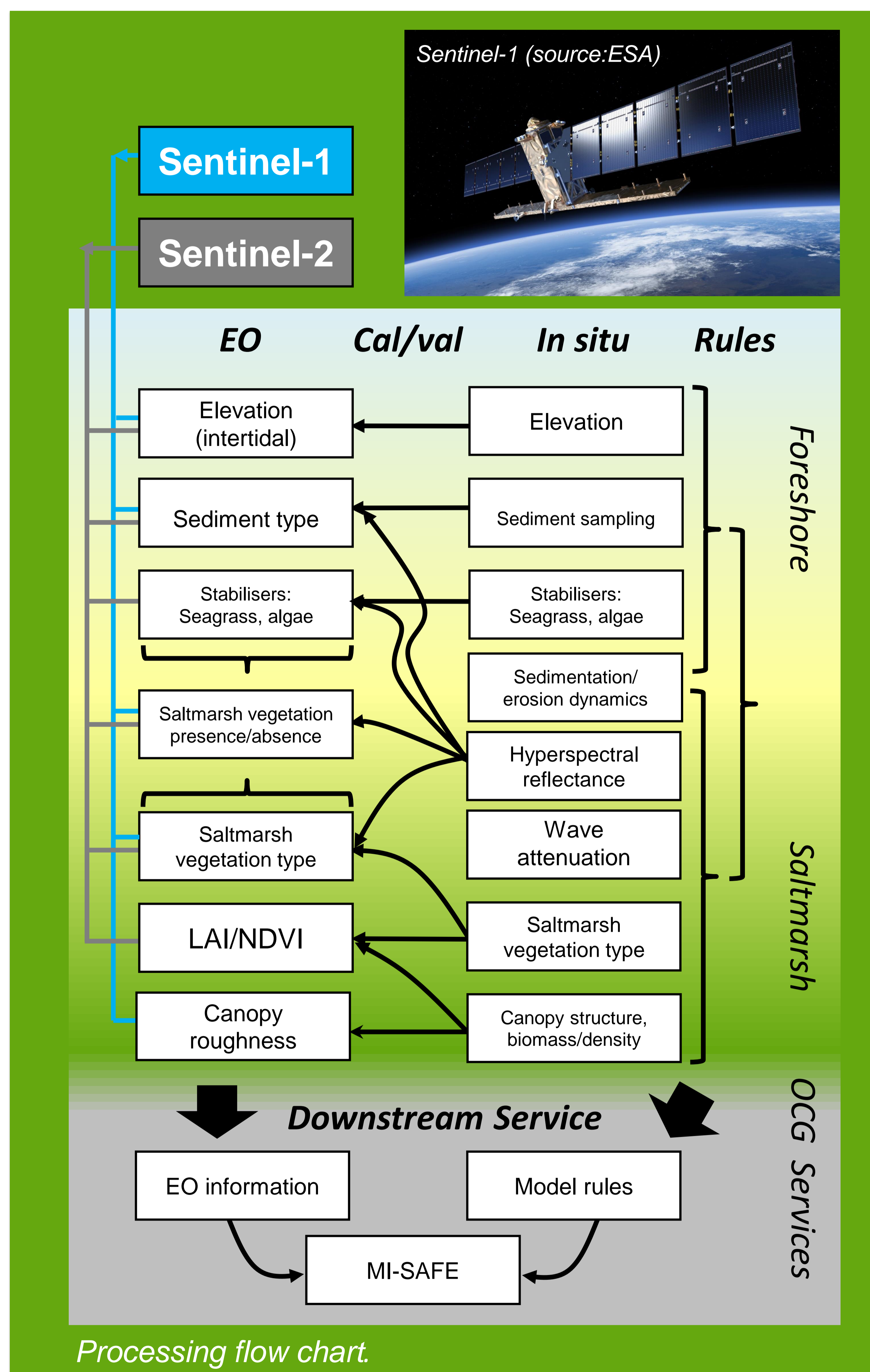
Approach

Sentinel-1 (C-band imaging SAR) and Sentinel-2 (Multi Spectral Instrument) data are selected to match the required spatial and spectral resolution and repeat coverage to cope with the environmental gradients and heterogeneity across and among foreshores, and temporal variations resulting from e.g., tidal inundation and phenology.

Algorithms will be developed to retrieve information on foreshore topography, vegetation structure and density, sediment type and stability from spaceborne imagery, with emphasis on Sentinel. They will be calibrated and validated with in situ data (via the centralized OpenEarth platform) at 8 pilot sites across Europe (Spain, Romania, United Kingdom and the Netherlands). Earth Observation (EO) information is combined with measurements on wave attenuation and erosion/deposition regimes to understand the functioning of foreshores.



Pilot site Paulinapolder (NL): NDVI-based map derived from a Formosat-2 image (NSPO) (left) and field (right).



Processing flow chart.

Anticipated results and service

EO and in situ data will be used to derive general relationships between foreshore characteristics and flood risk mitigation properties. In close collaboration with end users, this fundamental science will be developed into a Copernicus downstream service, providing Foreshore Assessment based on Sentinel data.