



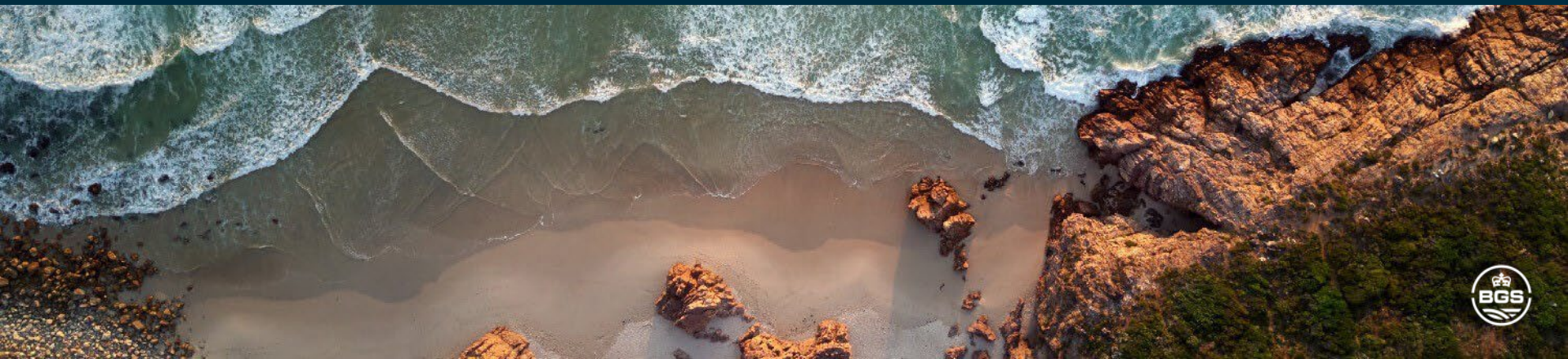
FOSS4G:UK LOCAL, 7<sup>TH</sup> SEP 2023, KEYWORTH

# The journey of Coastal Modeling Environment software (CoastalME) from proof of concept to operational tool and beyond

Andres Payo



British  
Geological  
Survey



# Where are we in the journey to reproducible, ethical and collaborative data science?

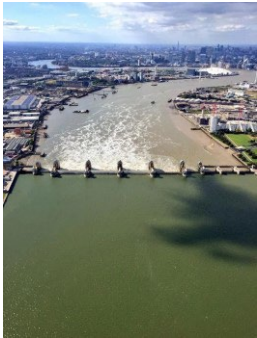


Fig. 1 The Turing Way project illustration by Scriberia. Zenodo.  
<http://doi.org/10.5281/zenodo.3332807>

## VISION

BGS to be a **trusted provider of data and knowledge** on different **adaptation options** to the escalating **coastal flooding and erosion risks** in the UK and internationally.

London Surge Barrier



Happisburgh, England



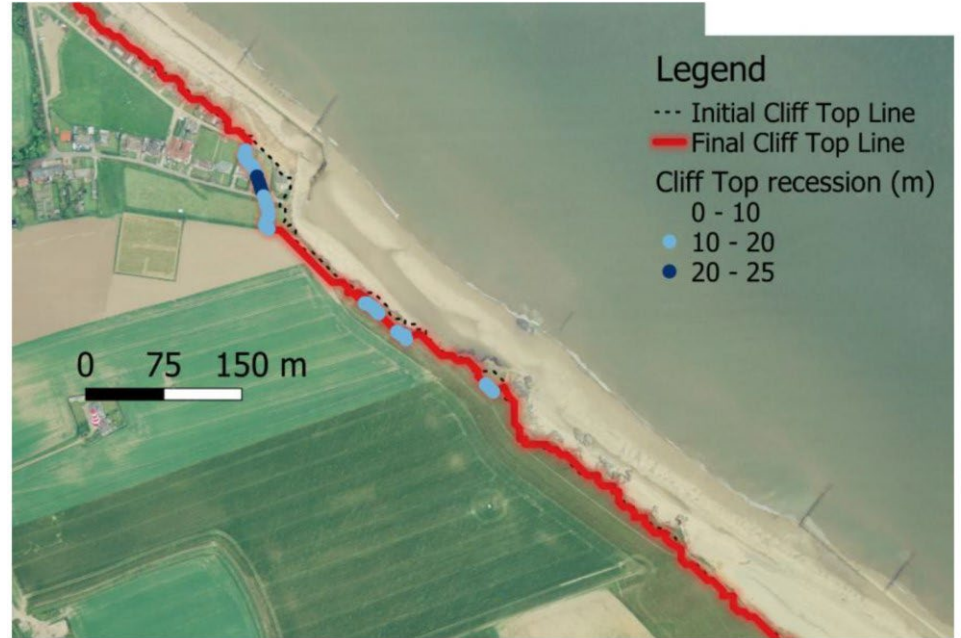
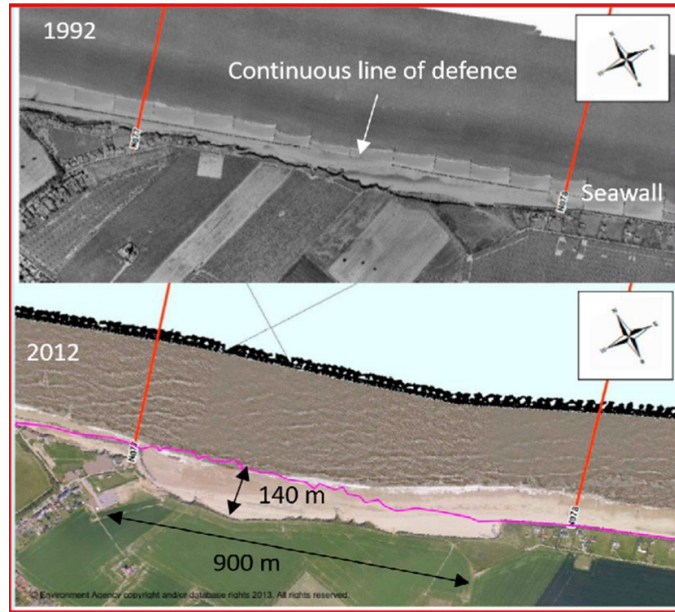
Fairbourne, Wales



“Worldwide, *coastal adaptation could reduce the expected impacts of SLR by a factor of 10 to less than \$1.5 trillion over the next two centuries*” From Diaz 2016, Climatic Change

# COASTALME IS A FOSS4G 3D COASTAL LANDSCAPE EVOLUTION MODELING

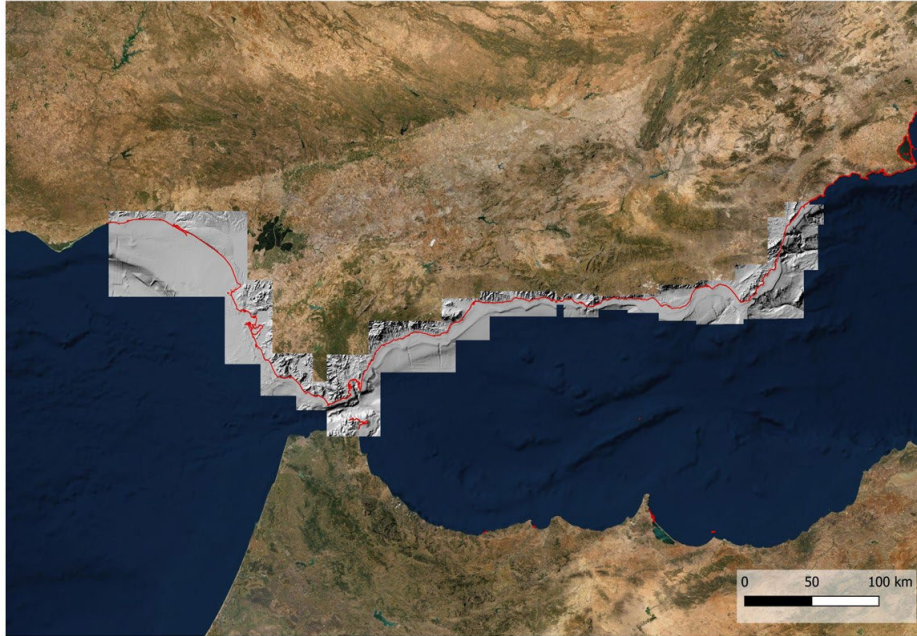
CoastalME can reproduce the fast coastal erosion observed at Happisburgh after removal of obsolete coastal defences



The CoastalME software version, including all the **input files** used in this study, can be found here:  
<https://doi.org/10.5281/zenodo.1418854>.

COASTALME IS A FOSS4G 3D COASTAL LANDSCAPE EVOLUTION MODELING

The application of CoastalME to the whole coastline length of Andalusia is our first major flagship

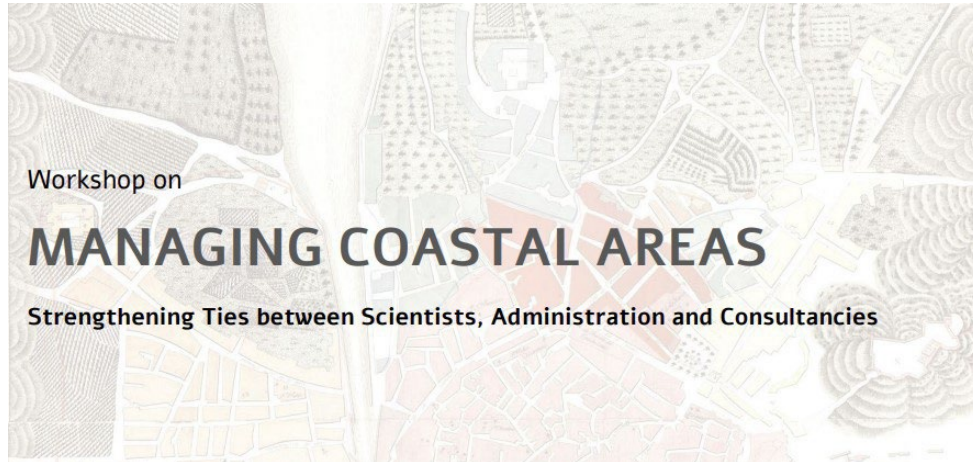


UNIVERSIDAD  
DE GRANADA



JUNTA DE ANDALUCIA

## The application of CoastalME to the whole coastline length of Andalusia is our first major flagship

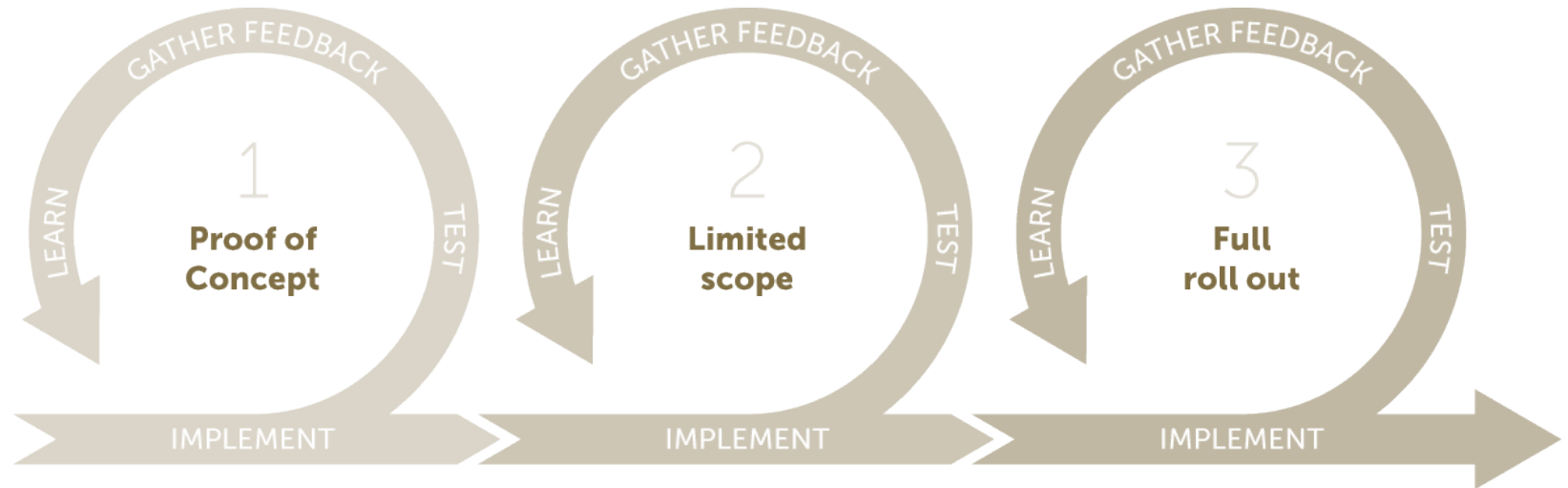


- 25<sup>th</sup> to 27<sup>th</sup> September 2023
- Malaga, Spain
- In person and online

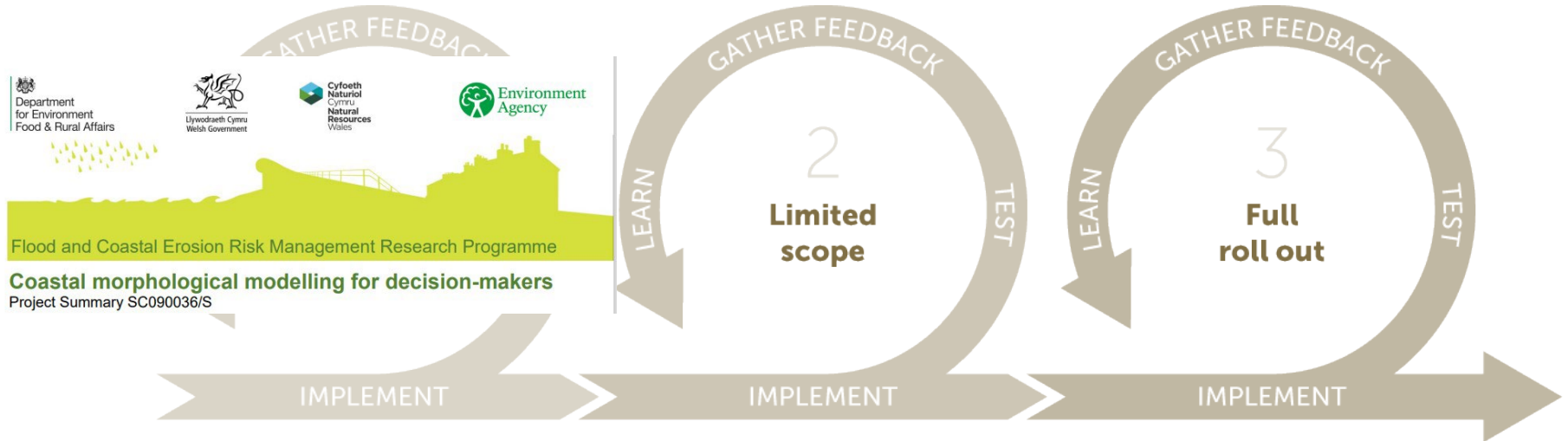
- Free registration

<https://www.unia.es/agenda/workshops/workshop>

To enable this vision, we are developing CoastalME in an AGILE fashion & with a growing community



# To enable this vision, we are developing CoastalME in an AGILE fashion & with a growing community

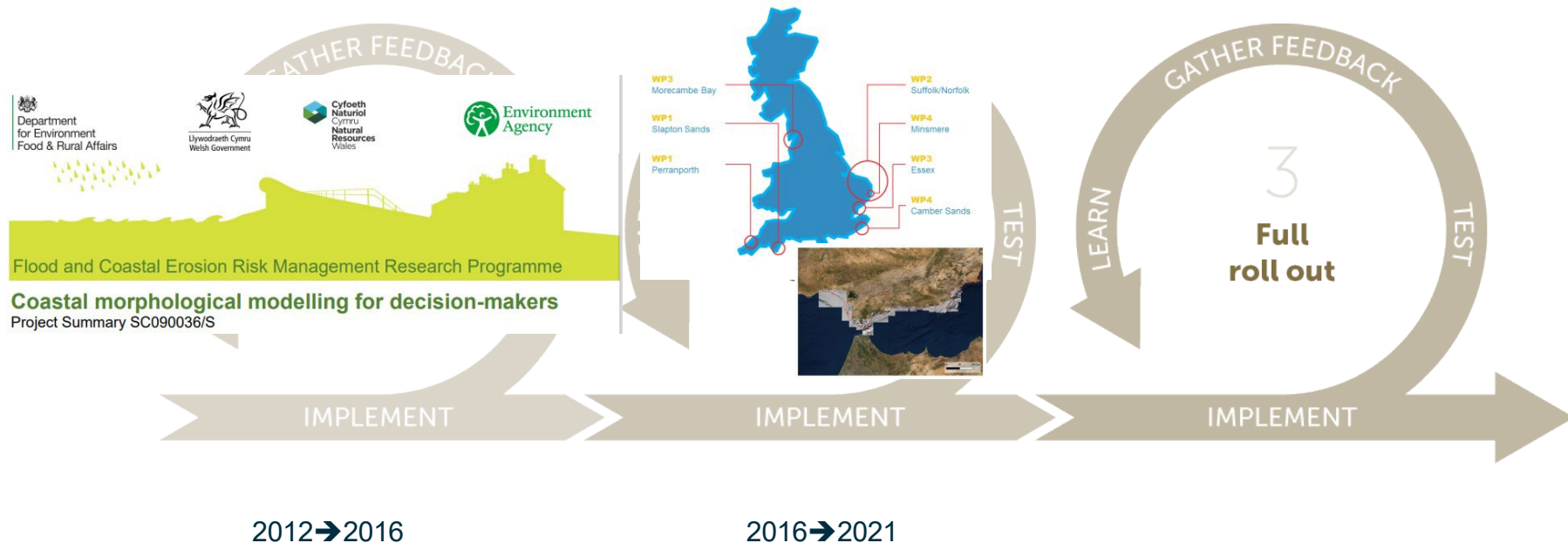


2012 → 2016



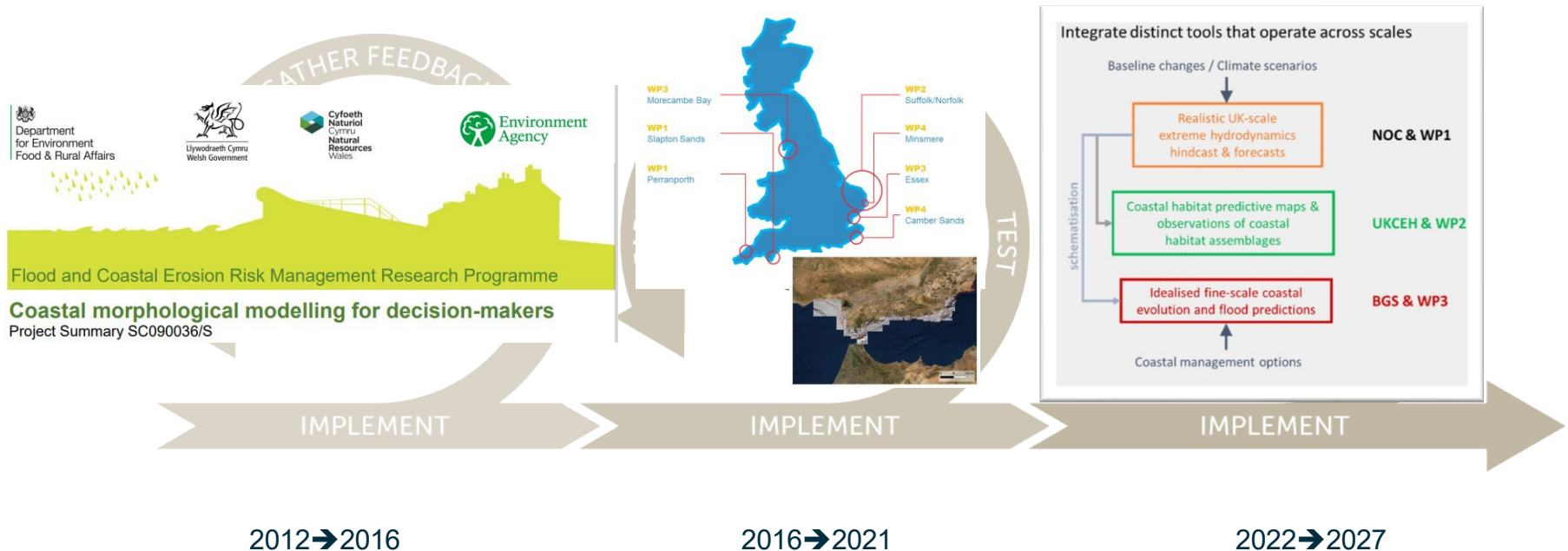
## COASTALME IS A FOSS4G 3D COASTAL LANDSCAPE EVOLUTION MODELING

# To enable this vision, we are developing CoastalME in an AGILE fashion & with a growing community



# COASTALME IS A FOSS4G 3D COASTAL LANDSCAPE EVOLUTION MODELING

## To enable this vision, we are developing CoastalME in an AGILE fashion & with a growing community



# The core developing team is still small but brings together partners from Industry and academia

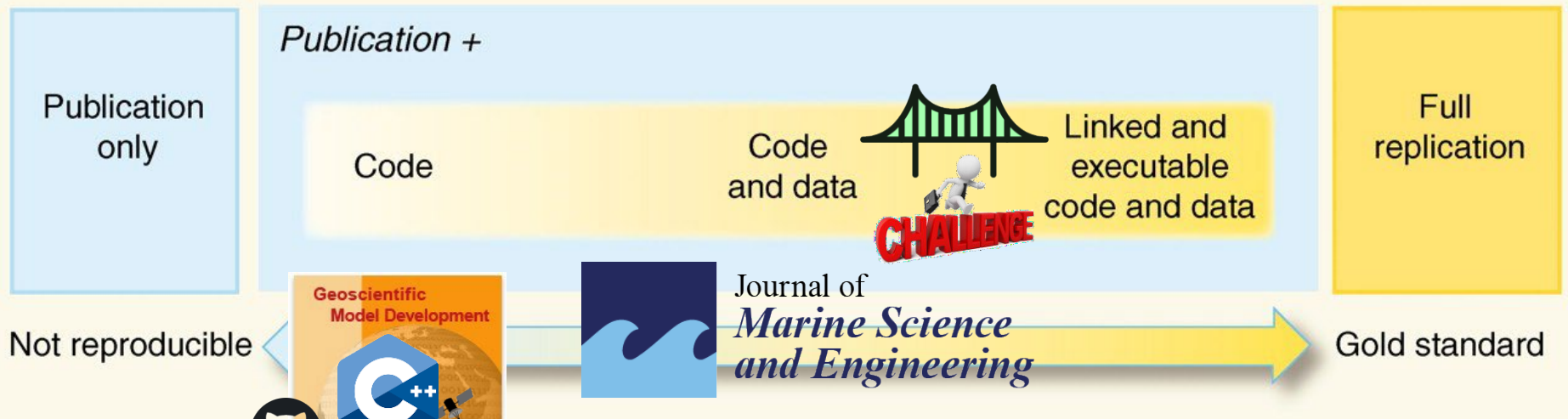


1<sup>st</sup> CoastalME developers meeting February 2023, Keyworth

# Where are we along the reproducibility spectrum?

<https://www.science.org/doi/10.1126/science.1213847>

## Reproducibility Spectrum



Not reproducible



Journal of  
*Marine Science  
and Engineering*

<https://doi.org/10.3390/jmse6040113>

<https://doi.org/10.5281/zenodo.1418854>

[https://github.com/davefavismortlock/coastalme\\_TESTING](https://github.com/davefavismortlock/coastalme_TESTING)

Gold standard

<https://gmd.copernicus.org/articles/10/2715/2017/>

<https://github.com/coastalme/coastalme>



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# Developing CoastalME requires many core & domain specific geospatial skills which limits reproducibility



## Core skills

- Spatial Data Processing >> QGIS, SAGA, ArcGIS,...
- Object oriented programming Language >> C++

## Domain specific skills

- Scripting >> GDAL Tools, Shell scripting
- Mapping >> Geological 3D mapping
- Met-Ocean >> Downscaling, nearshore process, morpho-dynamic
- Engineering >> Large Data, communication, ...

If you are thinking about  
contributing to a  
FOSS4G...

...think on CoastalME

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