Plan Overview

A Data Management Plan created using DMPonline

Title: A cosmogenic-nuclide approach to quantifying the drivers of rocky coastline erosion under changing climate and sea-level conditions.

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Template: Health Research Board DMP Template

Project abstract:

Large parts of the Irish coastline show rocky structures like cliffs and shore platforms (European Commission, 2023) and the effects of a rising sea level and erosion of shorelines and cliffs, including short term events like rockfalls and landslides, are potential geohazards for coastal areas (Violante, 2009; Yonggang et al., 2016). Despite large parts of the Ireland coastline are hard rock coasts (European Commission, 2023), a lot of the past research was regarding erosion and morphological changes of softer coasts, like beaches and estuaries (e.g. Carter and Stone, 1989; Cooper et al., 2004; Cronin et al., 2007; Swift et al., 2007; Guisado-Pintado and Jackson, 2019; Jackson et al., 2022) and much less research was focused on rocky coastlines (e.g. Thébaudeau et al., 2013; Cullen and Bourke, 2018; Cullen et al., 2018).

To fill this gap of knowledge, this research project will investigate erosion rates of rocky coasts by measuring the amount of produced 10Be in shore platforms, following an approach similar to Regard et al., 2012; Hurst et al., 2016, 2017 and Swirad et al., 2020. Due to a production rate of 5.1 ± 0.3 , the measured amount 10Be reflects a long-term erosion rate in 1000 or 10000 year timescales (Gosse and Phillips, 2001; Markl, 2015). For studying the erosion history of the coastline on shorter timescales of years and decades and to investigate influences of storm events or seasons, this study uses historical map data, aerial photographs and Structure from Motion (SfM). SfM is a photogrammetric approach, that provides high resolution results in both temporal and special scales, while occurring as a fast and low-coast method with little gear requirements (Westoby et al., 2012; Gonçalves and Henriques, 2015; Piermattei et al., 2015; Swirad et al., 2019).

To gain as much information as possible, several sites along the Irish coast with different specifications in geology, geomorphology and geographical setting will be sampled and surveyed. Studying past coastal erosion and its drivers in different setting and locations will help us to model and simulate potential future evolutions of the Irish coastline, especially regarding climate change.

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Copyright information:

A cosmogenic-nuclide approach to quantifying the drivers of rocky coastline erosion under changing climate and sea-level conditions.

Data description and collection or re-use of existing data

How will new data be collected or produced and/or how will existing data be re-used?

New data will consist of experimental data (lab measurements), field data (drone flights and GNSS) and outputs of drone analysis (point clouds and Digital Surface Models) and of numerical modelling. Existing data will consist of published experimental data from previous studies and field data, purchased from Tailte Éireann.

What data (for example the kind, formats, and volumes), will be collected or produced?

Type of data	How will data be collected? (If re-using data indicate source)	Purpose of data collection?	File format(s)	Volume
experimental (new)	lab measurements	measuring concentrations of Beryllium-10	.txt	1-2 KB
experimental (existing)	reuse of existing Swirad et al. 2020, 10.1038/s41467-020-17611-9 Jeong et al. 2024 , 10.1016/j.margeo.2024.107291	setting up and testing the model of Swirad et al. (2020), before using it with own data	.txt	200KB
field data (new and output)	field measurements with drones and GNSS	generating high resolution Digital Surface Models for numerical modelling and coastal change analysis; generating 3D point clouds of costal cliffs for change analysis	.txt .png .e57 .tiff	500GB
field data (existing)	reuse of historical maps, purchased from Tailte Éireann.	Analysing of historical coastal change	wms-layers for GIS	
numerical (output)	numerical models	analysing possible coastal erosion based on measured concetrations of Beryllium-10	.mat .txt	1MB

Documentation and data quality

What metadata and documentation (for example the methodology of data collection and way of organising data) will accompany data?

Indicate which metadata will be provided to help others identify and discover the data.
Indicate which metadata standards (for example DDI, TEI, EML, MARC, CMDI) will be used and potential community standards available.
Use community metadata standards where these are in place

What data quality control measures will be used?

Experimental data: standardised workflow, 1 blank for every five samples
field data: standardised workflow, calibration of measured coordinates via GNSS base station
numerical data: use of an already reviewed model (Swirad et al. 2020, 10.1038/s41467-020-17611-9)

Storage and backup during the research process

How will data and metadata be stored and backed up during the research process?

All data and metadata will be stored on the computer and automatically uploaded to the cloud system of the University of Galway and backed up on an external hard drive at least once every month. Research output will be backed up at the google-drive folder provided by iCRAG.

How will data security and protection of sensitive data be taken care of during the research?

Detail the key risks to the confidentiality and security related to human participants or other sensitive data and how this information will be managed.

Legal and ethical requirements, codes of conduct

If personal data are processed, how will compliance with legislation on personal data and on security be ensured?

No personal data will be processed

How will other legal issues, such as intellectual property rights and ownership, be managed? What legislation is applicable?

Explain who will be the owner of the data and who will have the rights to control access

What ethical issues and codes of conduct are there, and how will they be taken into account?

Consider whether ethical issues can affect how data are stored and transferred, who can see or use them, and how long they are kept.

Data sharing and long-term preservation

How and when will data be shared? Are there possible restrictions to data sharing or embargo reasons?

Explain how the data will be discoverable and shared (for example by deposit in a trustworthy data repository, indexed in a catalogue, use of a secure data service, direct handling of data requests, or use of another mechanism).

How will data for preservation be selected, and where data will be preserved long-term (for example a data repository or archive)?

Indicate what data must be retained or destroyed for contractual, legal, or regulatory purposes.

What methods or software tools are needed to access and use data?

Indicate whether potential users need specific tools to access and (re-)use the data. Consider the sustainability of software needed for accessing the data.

How will the application of a unique and persistent identifier (such as a Digital Object Identifier (DOI)) to each data set be ensured?

Explain how the data might be re-used in other contexts. Persistent identifiers should be applied so that data can be reliably and efficiently located and referred to. Persistent identifiers also help to track citations and re-use.

Data management responsibilities and resources

Who (for example role, position, and institution) will be responsible for data management (i.e. the data steward)?

Outline the roles and responsibilities for data management/stewardship activities for example data capture, metadata production, data quality, storage and backup, data archiving, and data sharing. Alongside the PI, specify who is responsible for ensuring of the completion of these tasks.

What resources (for example financial and time) will be dedicated to data management and ensuring that data will be FAIR (Findable, Accessible, Interoperable, Re-usable)?

Explain how the necessary resources (for example time) to prepare the data for sharing/preservation (data curation) have been costed in. Carefully consider and justify any resources needed to deliver the data. These may include storage costs, hardware, staff time, costs of preparing data for deposit, and repository charges.