

FWO DMP Template - Flemish Standard Data Management Plan

Version KU Leuven

Project supervisors (from application round 2018 onwards) and fellows (from application round 2020 onwards) will, upon being awarded their project or fellowship, be invited to develop their answers to the data management related questions into a DMP. The FWO expects a **completed DMP no later than 6 months after the official start date** of the project or fellowship. The DMP should not be submitted to FWO but to the research co-ordination office of the host institute; FWO may request the DMP in a random check.

At the end of the project, the **final version of the DMP** has to be added to the final report of the project; this should be submitted to FWO by the supervisor-spokesperson through FWO's e-portal. This DMP may of course have been updated since its first version. The DMP is an element in the final evaluation of the project by the relevant expert panel. Both the DMP submitted within the first 6 months after the start date and the final DMP may use this template.

The DMP template used by the Research Foundation Flanders (FWO) corresponds with the Flemish Standard Data Management Plan. This Flemish Standard DMP was developed by the Flemish Research Data Network (FRDN) Task Force DMP which comprises representatives of all Flemish funders and research institutions. This is a standardized DMP template based on the previous FWO template that contains the core requirements for data management planning. To increase understanding and facilitate completion of the DMP, a standardized **glossary** of definitions and abbreviations is available via the following [link](#).

1. General Project Information	
Name Grant Holder & ORCID	Camilla Scolini (PI of the project) / ORCID: 0000-0002-5681-0526
Contributor name(s) (+ ORCID) & roles	Stefaan Poedts (supervisor)
Project number ¹ & title	Title: Interacting coronal mass ejections: origin, evolution, and helio-effectiveness across the inner heliosphere (FWO Senior Postdoctoral Fellowship 1273324N)
Funder(s) GrantID ²	
Affiliation(s)	X KU Leuven <input type="checkbox"/> Universiteit Antwerpen <input type="checkbox"/> Universiteit Gent <input type="checkbox"/> Universiteit Hasselt <input type="checkbox"/> Vrije Universiteit Brussel X Other: Royal Observatory of Belgium ROR identifier KU Leuven: 05f950310

¹ "Project number" refers to the institutional project number. This question is optional. Applicants can only provide one project number.

² Funder(s) GrantID refers to the number of the DMP at the funder(s), here one can specify multiple GrantIDs if multiple funding sources were used.

Please provide a short project description	<p>Since the advent of the Space Age, our society has become more and more susceptible to the conditions of the near-Earth space, which is primarily shaped by solar activity. Coronal mass ejections (CMEs) are the most energetic and largest scale solar eruptions and are the main drivers of severe space weather disturbances at Earth. When launched in rapid succession, CMEs can interact during propagation through interplanetary space, undergoing alterations that can dramatically increase their space weather impact. Despite the potentially devastating effects on human activities, the complex dynamics of interacting CMEs and of their associated space weather potential is rarely studied at locations other than Earth. The exciting perspective of exploring of new regions of the heliosphere promptly calls for more comprehensive studies of CME-CME interactions and their influence on the space environment in different regions of our Solar System. This challenging effort can now be pursued thanks to the development of more realistic and less computationally expensive numerical models, able to describe the evolution of interacting CMEs to unprecedented levels of detail. In this project, I propose a cutting-edge investigation of CME-CME interactions using a combination of observational, theoretical, and advanced modelling approaches with the ambitious goal of mapping their origin and role in shaping the interplanetary conditions across different regions of the heliosphere.</p>
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2. Research Data Summary

List and describe all datasets or research materials that you plan to generate/collect or reuse during your research project. For each dataset or data type (observational, experimental etc.), provide a short name & description (sufficient for yourself to know what data it is about), indicate whether the data are newly generated/collected or reused, digital or physical, also indicate the type of the data (the kind of content), its technical format (file extension), and an estimate of the upper limit of the volume of the data ³.

Dataset Name	Description	New or Reused	Digital or Physical	ONLY FOR DIGITAL DATA	ONLY FOR DIGITAL DATA	ONLY FOR DIGITAL DATA	ONLY FOR PHYSICAL DATA
				Digital Data Type	Digital Data Format	Digital Data Volume (MB, GB, TB)	Physical Volume
WP1 event list	Enhanced database of CMEs from super ARs; related to execution of WP1	<input checked="" type="checkbox"/> Generate new data <input type="checkbox"/> Reuse existing data	<input checked="" type="checkbox"/> Digital <input type="checkbox"/> Physical	<input type="checkbox"/> Audiovisual <input type="checkbox"/> Images <input type="checkbox"/> Sound <input type="checkbox"/> Numerical <input checked="" type="checkbox"/> Textual <input type="checkbox"/> Model <input checked="" type="checkbox"/> Software <input type="checkbox"/> Other:	.csv, .txt, .xlsx, .png, .py	<input checked="" type="checkbox"/> < 1 GB <input type="checkbox"/> < 100 GB <input type="checkbox"/> < 1 TB <input type="checkbox"/> < 5 TB <input type="checkbox"/> > 5 TB <input type="checkbox"/> NA	
WP2 analytical and probabilistic models	Development of analytical and probabilistic model to describe temporal and radial evolution of individual CMEs during CME-CME interactions; related to execution of WP2	<input checked="" type="checkbox"/> Generate new data <input type="checkbox"/> Reuse existing data	<input checked="" type="checkbox"/> Digital <input type="checkbox"/> Physical	<input type="checkbox"/> Audiovisual <input checked="" type="checkbox"/> Images <input type="checkbox"/> Sound <input checked="" type="checkbox"/> Numerical <input checked="" type="checkbox"/> Textual <input checked="" type="checkbox"/> Model <input checked="" type="checkbox"/> Software <input type="checkbox"/> Other:	.csv, .txt, .xlsx, .png, .py	<input type="checkbox"/> < 1 GB <input checked="" type="checkbox"/> < 100 GB <input type="checkbox"/> < 1 TB <input type="checkbox"/> < 5 TB <input type="checkbox"/> > 5 TB <input type="checkbox"/> NA	

WP3 physics-based simulations	Physics-based simulations of interacting CMEs using the EUHFORIA heliospheric model; related to execution of WP3	<input checked="" type="checkbox"/> Generate new data <input type="checkbox"/> Reuse existing data	<input checked="" type="checkbox"/> Digital <input type="checkbox"/> Physical	<input type="checkbox"/> Audiovisual <input checked="" type="checkbox"/> Images <input type="checkbox"/> Sound <input checked="" type="checkbox"/> Numerical <input checked="" type="checkbox"/> Textual <input type="checkbox"/> Model <input checked="" type="checkbox"/> Software <input type="checkbox"/> Other:	.png, .mp4, .csv, .npz, .vtr, .py	<input type="checkbox"/> < 1 GB <input type="checkbox"/> < 100 GB <input type="checkbox"/> < 1 TB <input checked="" type="checkbox"/> < 5 TB <input type="checkbox"/> > 5 TB <input type="checkbox"/> NA	

GUIDANCE:
The data description forms the basis of your entire DMP, so make sure it is detailed and complete. It includes digital and physical data and encompasses the whole spectrum ranging from raw data to processed and analysed data including analysis scripts and code. Physical data are all materials that need proper management because they are valuable, difficult to replace and/or ethical issues are associated. Materials that are not considered data in an RDM context include your own manuscripts, theses and presentations; documentation is an integral part of your datasets and should be described under documentation/metadata.

[RDM Guidance on data](#)

If you reuse existing data, please specify the source, preferably by using a persistent identifier (e.g. DOI, Handle, URL etc.) per dataset or data type.	N/A
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³ Add rows for each dataset you want to describe.

Are there any ethical issues concerning the creation and/or use of the data (e.g. experiments on humans or animals, dual use)? If so, refer to specific datasets or data types when appropriate and provide the relevant ethical approval number.	<input type="checkbox"/> Yes, human subject data; provide SMEC or EC approval number: <input type="checkbox"/> Yes, animal data; provide ECD reference number: <input type="checkbox"/> Yes, dual use; provide approval number: <input checked="" type="checkbox"/> No Additional information:
Will you process personal data ⁴ ? If so, please refer to specific datasets or data types when appropriate and provide the KU Leuven or UZ Leuven privacy register number (G or S number).	<input type="checkbox"/> Yes (provide PRET G-number or EC S-number below) <input checked="" type="checkbox"/> No Additional information:
Does your work have potential for commercial valorization (e.g. tech transfer, for example spin-offs, commercial exploitation, ...)? If so, please comment per dataset or data type where appropriate.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, please comment:
Do existing 3rd party agreements restrict exploitation or dissemination of the data you (re)use (e.g. Material/Data transfer agreements, research collaboration agreements)? If so, please explain to what data they relate and what restrictions are in place.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, please explain:
Are there any other legal issues, such as intellectual property rights and ownership, to be managed related to the data you (re)use? If so, please explain to what data they relate and which restrictions will be asserted.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, please explain:

⁴ See Glossary Flemish Standard Data Management Plan

3. Documentation and Metadata

Clearly describe what approach will be followed to capture the accompanying information necessary to keep **data understandable and usable**, for yourself and others, now and in the future (e.g. in terms of documentation levels and types required, procedures used, Electronic Lab Notebooks, README.txt files, Codebook.tsv etc. where this information is recorded).

[*RDM guidance on documentation and metadata.*](#)

- Creation of concept map and documentation detailing structure of data archive
- Inclusion of README.txt files that detail the content and structure of individual data folders
- Clear documentation of input files/input parameters/external data sources (when applicable)
- Inclusion of python notebooks explaining users how to access and manipulate the archived data
- Versioning of files to keep track of changes over time

Will a metadata standard be used to make it easier to **find and reuse the data**?

If so, please specify which metadata standard will be used. If not, please specify which metadata will be created to make the data easier to find and reuse.

REPOSITORIES COULD ASK TO DELIVER METADATA IN A CERTAIN FORMAT, WITH SPECIFIED ONTOLOGIES AND VOCABULARIES, I.E. STANDARD LISTS WITH UNIQUE IDENTIFIERS.

☐ Yes

☒ No

If yes, please specify (where appropriate per dataset or data type) which metadata standard will be used:

If no, please specify (where appropriate per dataset or data type) which metadata will be created:
A metadata standard will be developed specifically for this project.

4. Data Storage & Back-up during the Research Project

<p>Where will the data be stored?</p> <p><i>Consult the interactive KU Leuven storage guide to find the most suitable storage solution for your data.</i></p>	<p> <input type="checkbox"/> Shared network drive (J-drive) <input type="checkbox"/> Personal network drive (I-drive) <input checked="" type="checkbox"/> OneDrive (KU Leuven) <input type="checkbox"/> Sharepoint online <input type="checkbox"/> Sharepoint on-premis <input checked="" type="checkbox"/> Large Volume Storage <input type="checkbox"/> Digital Vault <input type="checkbox"/> Other: </p>
<p>How will the data be backed up?</p> <p><i>WHAT STORAGE AND BACKUP PROCEDURES WILL BE IN PLACE TO PREVENT DATA LOSS?</i></p>	<p> <input checked="" type="checkbox"/> Standard back-up provided by KU Leuven ICTS for my storage solution <input type="checkbox"/> Personal back-ups I make (specify) <input type="checkbox"/> Other (specify) </p>
<p>Is there currently sufficient storage & backup capacity during the project? If yes, specify concisely. If no or insufficient storage or backup capacities are available, then explain how this will be taken care of.</p>	<p> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No </p> <p>If no, please specify: the project has not yet started (the PI is on unpaid leave until October 2024). Once the project will start, access to the KU Leuven RDR and KU Leuven Large Volume Storage will be set up by the PI.</p>

<p>How will you ensure that the data are securely stored and not accessed or modified by unauthorized persons?</p> <p><i>CLEARLY DESCRIBE THE MEASURES (IN TERMS OF PHYSICAL SECURITY, NETWORK SECURITY, AND SECURITY OF COMPUTER SYSTEMS AND FILES) THAT WILL BE TAKEN TO ENSURE THAT STORED AND TRANSFERRED DATA ARE SAFE.</i></p> <p>Guidance on security for research data</p>	
<p>What are the expected costs for data storage and backup during the research project? How will these costs be covered?</p>	<p>Estimated costs for data storage are around 0 euro/year for years 1 and 2 of the project, and around 500 euro/year for year 3 of the project (5TB on the KU Leuven Large Volume Storage). Costs will be covered through the yearly bench fee available for this project, and/or through other research budgets already available to the PI (Camilla Scolini) at KU Leuven.</p>

5. Data Preservation after the end of the Research Project	
<p>Which data will be retained for at least five years (or longer, in agreement with other retention policies that are applicable) after the end of the project? In case some data cannot be preserved, clearly state the reasons for this (e.g. legal or contractual restrictions, storage/budget issues, institutional policies...).</p> <p>Guidance on data preservation</p>	<p> <input type="checkbox"/> All data will be preserved for 10 years according to KU Leuven RDM policy <input type="checkbox"/> All data will be preserved for 25 years according to CTC recommendations for clinical trials with medicinal products for human use and for clinical experiments on humans <input checked="" type="checkbox"/> Certain data cannot be kept for 10 years (explain) </p> <p>Explanation: the full raw output data from WP3 (numerical simulations) is estimated around 5 TB and it will be used as starting point to generate research outputs/results that will be disseminated to the public. Storing such an amount of raw output data for 10+ years requires continuous budget and long-term management. Thus, we intend to store only a sub-set of raw output data (e.g. one set of raw outputs per simulation) for 10 years after the end of the research project. Lighter research output such as text files, images, videos, and catalogs will be preserved for 10 years on the KU Leuven RDR according to KU Leuven RDM policy.</p>

<p>Where will these data be archived (stored and curated for the long-term)?</p> <p><i>Dedicated data repositories are often the best place to preserve your data. Data not suitable for preservation in a repository can be stored using a KU Leuven storage solution, consult the interactive KU Leuven storage guide.</i></p>	<p><input checked="" type="checkbox"/> KU Leuven RDR</p> <p><input type="checkbox"/> Large Volume Storage (longterm for large volumes)</p> <p><input type="checkbox"/> Shared network drive (J-drive)</p> <p><input type="checkbox"/> Other (specify):</p>
<p>What are the expected costs for data preservation during the expected retention period? How will these costs be covered?</p>	<p>No estimated costs are expected to preserve data over the course of 10 years after the end of the project. Long-term storage will be achieved through the KU Leuven RDR.</p>

6. Data Sharing and Reuse

<p>Will the data (or part of the data) be made available for reuse after/during the project? Please explain per dataset or data type which data will be made available.</p> <p><i>NOTE THAT 'AVAILABLE' DOES NOT NECESSARILY MEAN THAT THE DATA SET BECOMES OPENLY AVAILABLE, CONDITIONS FOR ACCESS AND USE MAY APPLY. AVAILABILITY IN THIS QUESTION THUS ENTAILS BOTH OPEN & RESTRICTED ACCESS. FOR MORE INFORMATION: https://wiki.surfnet.nl/display/STANDARDS/INFO-EU-REPO/#INFOEUREPO-ACCESSRIGHTS</i></p>	<p><input checked="" type="checkbox"/> Yes, as open data</p> <p><input type="checkbox"/> Yes, as embargoed data (temporary restriction)</p> <p><input type="checkbox"/> Yes, as restricted data (upon approval, or institutional access only)</p> <p><input type="checkbox"/> No (closed access)</p> <p><input type="checkbox"/> Other, please specify:</p>
<p>If access is restricted, please specify who will be able to access the data and under what conditions.</p>	<p>N/A</p>

<p>Are there any factors that restrict or prevent the sharing of (some of) the data (e.g. as defined in an agreement with a 3rd party, legal restrictions)? Please explain per dataset or data type where appropriate.</p>	<p> <input type="checkbox"/> Yes, privacy aspects <input type="checkbox"/> Yes, intellectual property rights <input type="checkbox"/> Yes, ethical aspects <input type="checkbox"/> Yes, aspects of dual use <input type="checkbox"/> Yes, other <input checked="" type="checkbox"/> No </p> <p>If yes, please specify:</p>
<p>Where will the data be made available? If already known, please provide a repository per dataset or data type.</p>	<p> <input checked="" type="checkbox"/> KU Leuven RDR <input type="checkbox"/> Other data repository (specify) <input type="checkbox"/> Other (specify) </p>
<p>When will the data be made available?</p>	<p> <input checked="" type="checkbox"/> Upon publication of research results <input type="checkbox"/> Specific date (specify) <input type="checkbox"/> Other (specify) </p>
<p>Which data usage licenses are you going to provide? If none, please explain why.</p> <p><i>A DATA USAGE LICENSE INDICATES WHETHER THE DATA CAN BE REUSED OR NOT AND UNDER WHAT CONDITIONS. IF NO LICENCE IS GRANTED, THE DATA ARE IN A GREY ZONE AND CANNOT BE LEGALLY REUSED. DO NOTE THAT YOU MAY ONLY RELEASE DATA UNDER A LICENCE CHOSEN BY YOURSELF IF IT DOES NOT ALREADY FALL UNDER ANOTHER LICENCE THAT MIGHT PROHIBIT THAT.</i></p> <p>Check the RDR guidance on licences for data and software sources code or consult the License selector tool to help you choose.</p>	<p> <input checked="" type="checkbox"/> CC-BY 4.0 (data) <input type="checkbox"/> Data Transfer Agreement (restricted data) <input type="checkbox"/> MIT licence (code) <input type="checkbox"/> GNU GPL-3.0 (code) <input type="checkbox"/> Other (specify) </p>

<p>Do you intend to add a PID/DOI/accession number to your dataset(s)? If already available, please provide it here.</p> <p><i>INDICATE WHETHER YOU INTEND TO ADD A PERSISTENT AND UNIQUE IDENTIFIER IN ORDER TO IDENTIFY AND RETRIEVE THE DATA.</i></p>	<p><input checked="" type="checkbox"/> Yes, a PID will be added upon deposit in a data repository</p> <p><input type="checkbox"/> My dataset already has a PID</p> <p><input type="checkbox"/> No</p>
<p>What are the expected costs for data sharing? How will these costs be covered?</p>	<p>N/A</p>

7. Responsibilities	
Who will manage data documentation and metadata during the research project?	Camilla Scolini
Who will manage data storage and backup during the research project?	Camilla Scolini
Who will manage data preservation and sharing?	Camilla Scolini (PI) / Stefaan Poedts (supervisor)
Who will update and implement this DMP?	Camilla Scolini