Title	Atmospheric escape on magma ocean exoplanets
Institution	Kapteyn Astronomical Institute

Participant(s)	**Name**	**Email address**	**Role**
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StartDate	2023-10-01	**EndDate**	2027-09-30
Number	FSE-20231206-14529	**Publish**	-

0.1 The reproducibility of results is vital to science. Aim of this RDMP is to have you think in advance how you will deal with data, data processing and simulations to make sure that your work done during the PhD or the Master project will be and remain reproducible. The RDMP should be discussed with your supervisor. The first version of your RDMP is required before the 6th month in a PhD and before the 3rd month of a master project. This version must be approved by the head of the computer group. The RDMP should be updated on a regular basis. The final version of the RDMP, describing data management has to be approved by the supervisor before the final grading or submission of the PhD manuscript. I agree:	Yes
1.0 Data Management Plan	
1.1 Title of the research project	Atmospheric escape on magma ocean exoplanets
1.10 If your thesis or RDMP do not fully describe results and/or origin of the data, then please enter additional information.	Nothing to say at the moment.
1.2	Tim Lichtenberg, Floris Van der Tak

Supervisor(s)	
1.3 What is the start date of your project?	2023-10-01
1.4 Give a brief (<200 words) description of your project	The atmospheric composition of gaseous and sub-Neptune exoplanets can now be identified thanks to JWST observations, but remains challenging for rocky planets such as super-Earths. Rocky planets atmospheres are molded by several phenomena: initial volatile budget, radiation from the host star, the escape of volatile species and more. On planets with largely molten planetary mantles, magma oceans, the volatile species present in the atmosphere, such as H2O or CO2, interact strongly with the interior through various processes like in- and outgassing. Escape mechanisms strongly shape the chemical evolution of magma ocean atmospheres. We aim to estimate the mass loss rate induced by escape mechanisms for some volatile species in the atmosphere of lava planets, evolving on geologic timescales. We use a coupled interior-atmosphere model (PROTEUS) to simulate the evolution of rocky planets during the magma ocean era, focusing on the atmospheric escape induced by the interaction between volatile escape and outgassing from the planetary interior.
1.5 Will you be using existing measurement data?	No
1.6 Has the existing data that you will use, already been processed?	No
1.7 Do you plan to process data yourself?	No
1.8 Will you be doing simulations?	Yes
1.8.1	I am developing a module called Zephyrus

Give a brief description on how you will perform (have performed) the simulations: • Software used • Input parameters • Describe data formats • Describe homebrew code and scripts	computing atmospheric escape on magma ocean exoplanets. This module is written in Python. Zephyrus is currently a public repository on GitHub. I am coupling this escape module to the PROTEUS framework (also a public GitHub repository), which is a code that we use in the Forming worlds (FW) group to compute the evolution of coupled atmosphere-interior models for magma ocean exoplanets. To compute the escape with Zephyrus, the current input parameters are : planet mass, incoming stellar flux and planet radius. I plan to include fractionation escape in this code, so there will be many more input parameters in the future.
1.9 Thesis (to be filled in the final version of the RDMP): Provide the location of all electronic versions of the tables, plots and images of the thesis.	