

MERIT REPORT OF A LAUREATE TEAM PROGRAMME

Project title:	Mars: another planet to approach geoscience issues		
Reporting period:	from 01/11/2011 to 30/04/2012	Period no.	2
Agreement No.:	TEAM/2011-7/9	from 01.09.2011 to 30.06.2015	
Laureate:	Daniel MEGE		

ATTENTION: the information given below should regard only the realization of the project in the reporting period indicated above.

1) INFORMATION CONCERNING THE PROGRESS OF THE RESEARCH (from 1000 to 5000 words)

a) Progress of the research tasks

Tuning of research tasks following the recruitment of the PhD students and postdocs

On November 25, 2011, 4 PhD students and 2 postdocs were recruited in the WROONA Group (Figure 1) by a committee composed of 3 members of ING PAN, 2 researchers from France, 2 from Germany, and 1 from the University of Wrocław. See the recruitment report dated November 29, 2011 (sent earlier).

The PhD students and postdocs had research topics identified on p. 14 of the submitted project. The PhD students topics were accurately identified in the project, whereas the postdocs topics were more loosely defined, the main criteria for selection being the adequacy with the research group activities, and the quality of the applications.

All the research topics found promising candidates who are adapted to the requested profiles, with the exception of PhD topic #2, which had to be slightly reoriented during the recruitment procedure, especially regarding the science methods, and therefore, the collaborations. The selection committee did not find an outstanding candidate with the appropriate background for this topic. Instead, the selection committee decided to hire an outstanding candidate to work on a closely related topic developed by WROONA Group members Joanna Gurgurewicz and Daniel Mège. Enrolled since 2010 in another PhD programme at the Institute of Experimental Physics of the University of Wrocław, this candidate is using experimental techniques that open exciting new perspectives in our research (see Progress in Research Task #2, below). This recruitment gives us the opportunity to initiate a collaboration with the Institute of Experimental Physics of the University of Wrocław. We are intending to strengthen this collaboration through a research project that will be submitted to the INTER programme of FNP.

These research topics are used in Table 1 to identify the research tasks for the whole duration of the project.

Research task ID*	Research tasks identified in the submitted project	Research tasks in the realized project, modified as a function of the candidates' profiles	TEAM members realizing the task
1	<i>Rheology of the Martian lithosphere</i>	Rheology of the Martian lithosphere	<u>Fionn Cullen</u> , Daniel Mège, Andrzej Żelaźniewicz
2	<i>Early climate of Mars</i>	Diagnostic climate signatures of basalt alteration on Earth and Mars	<u>Marta Skiścim</u> , Joanna Gurgurewicz, Marion Massé, Antoine Séjourné
3	<i>Gravitational instabilities of topography – Deep-seated gravitational spreading on Mars and Earth</i>	Deep-seated gravitational spreading on Mars and Earth	<u>Magdalena Makowska</u> , <u>Olga Kromuszczyńska</u> , Daniel Mège, Marion Massé
4	<i>Gravitational instabilities of topography – Landslides on Mars and Earth</i>	Landslides on Mars and Earth	<u>Timur Borikov</u> , Daniel Mège, Antoine Séjourné
5	<i>Mars geoscience</i>	Evolution of periglacial landforms on Earth and Mars related to global climate changes	<u>Antoine Séjourné</u> , Marion Massé, Daniel Mège
6	<i>Solar system science</i>	Ice processes and landforms	<u>Marion Massé</u> , Antoine Séjourné, Daniel Mège

TABLE 1 – UPDATED LIST OF RESEARCH TASKS OF TEAM MEMBERS.
The underlined names indicate the main researchers carrying out the job.

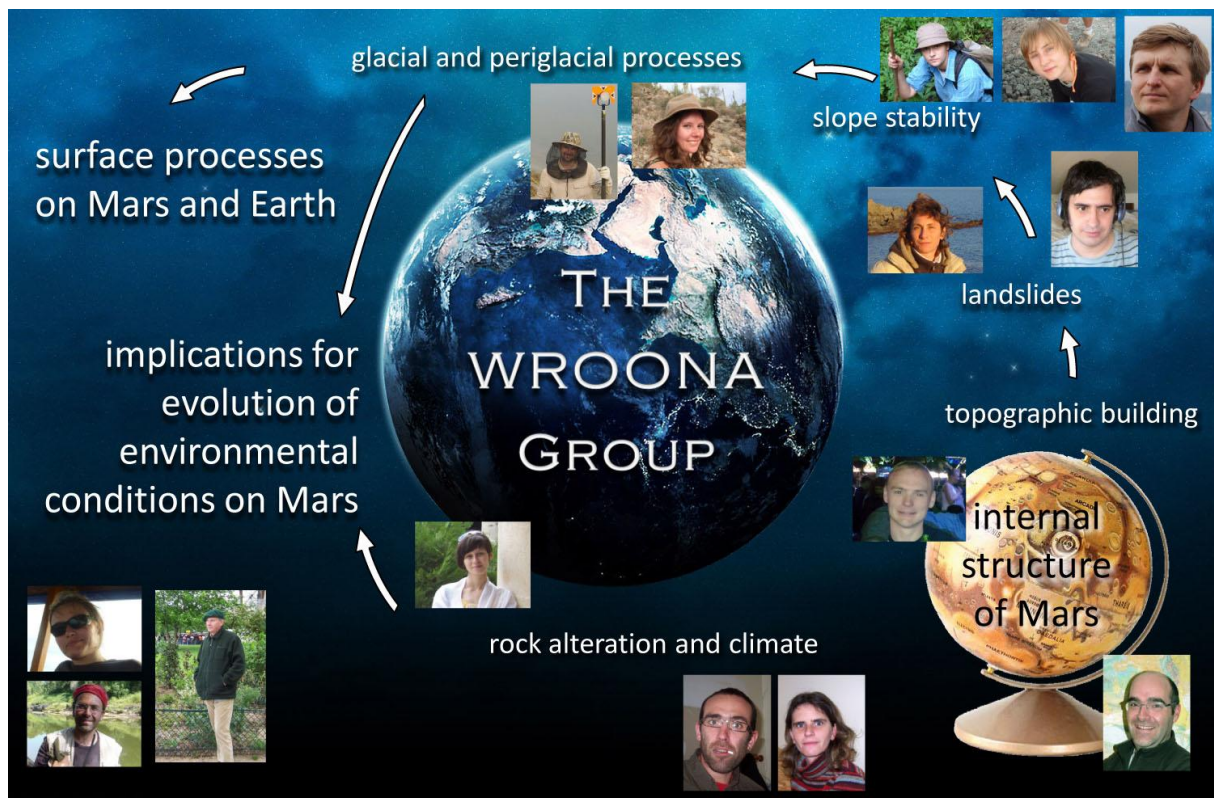


FIGURE 1. The research topics investigated by the WROONA group, the group members, and some collaborators: the groups from upper left to lower right are: Antoine Séjourné (postdoc) and Marion Massé (postdoc); Olga Kromuszczyńska (PhD), Magdalena Makowska (PhD), and Piotr Migoń (U. Wrocław); Anne Mangeney (IPG Paris) and Timur Borikov (PhD); Joanna Gurgurewicz (WROONA Deputy PI), Daniel Mège (WROONA PI) and Andrzej Żelaźniewicz (WROONA Professor); Marta Skiścim (PhD), Véronique Carrère, Yann Morizet and Anne Gaudin (U. Nantes); Fionn Cullen (PhD) and Fred Gueydan (U. Montpellier).

Research Task 1 – Rheology of the Martian lithosphere

This task aims at using the Valles Marineris crustal-scale depression ("rift"?) on Mars¹ to constrain the rheology of the Martian crust and upper mantle, and its evolution through time (Figure 2). The work has two sides, (1) investigating the tectonics of Valles Marineris (supervised by Daniel Mège at ING PAN), and (2) finite element modelling of the stretched lithosphere (supervised by Frédéric Gueydan at University of Montpellier II, France). Fionn Cullen, who is investigating this research topic, is a tectonicist by training.

- From January to March, he was trained to the geology and tectonics of Mars and Valles Marineris at ING PAN.
- On March 25 he was sent to Montpellier for 2 months in order to be trained to finite element modelling.
- On March 28 he made a presentation of his research task in Montpellier (objectives, basic things and issues relating to Valles Marineris, available datasets and constraints, what are the expected results at the end of his PhD, and how he thinks they can be achieved).
- Between March 29 and April 30 he started familiarize with finite element modelling in Montpellier under the guidance of Prof. Gueydan, and started identification of the parameters of rheological models of Valles Marineris to be tested. He will stay in Montpellier until May 24.

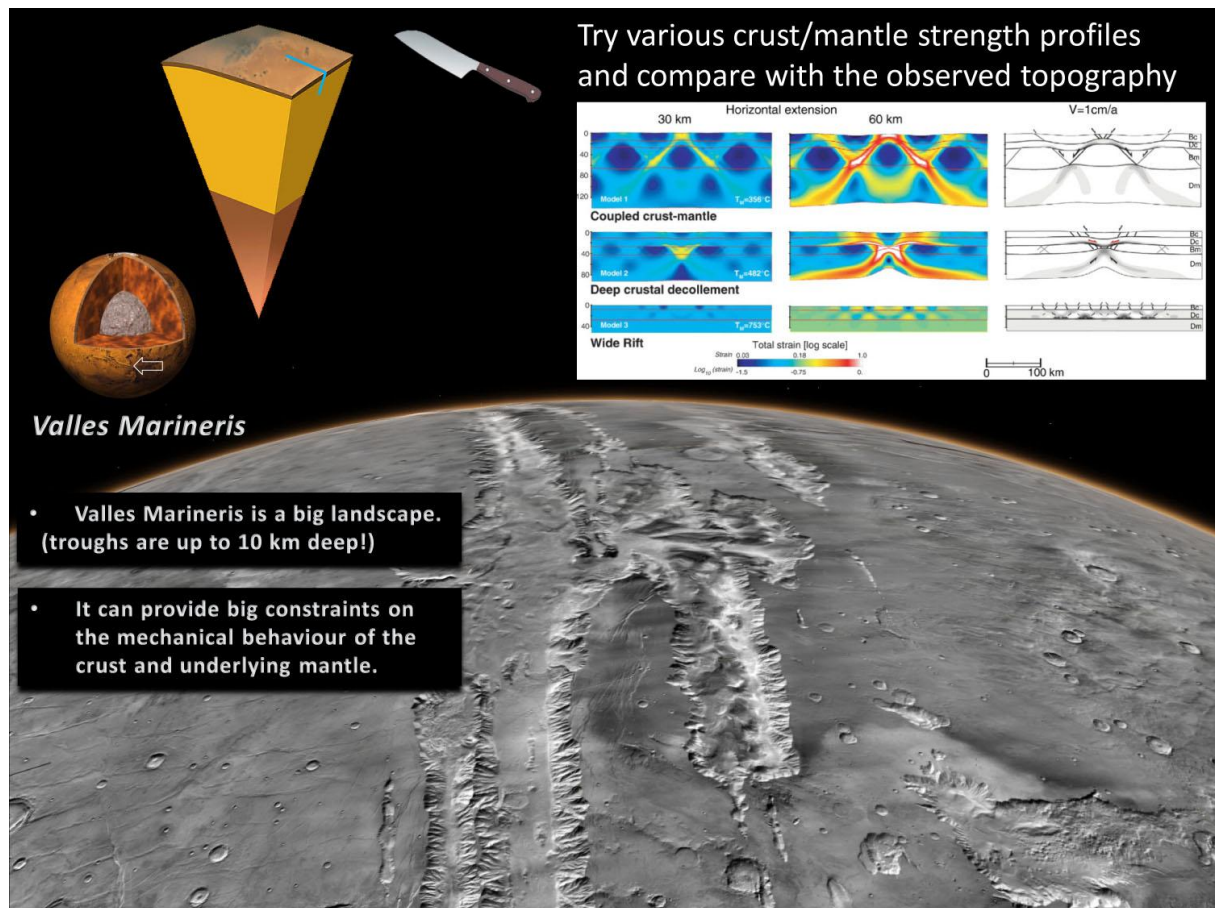


FIGURE 2. TASK 1. The Valles Marineris troughs on Mars. At its widest (middle of the image), trough width is 580 km. Sun illumination is from the top of the image. In Task 1, rheological models of the Valles Marineris area are investigated, based on results obtained on rheology of terrestrial rifts such as in the inset (after Gueydan et al., 2008, Tectonophysics 460, 83–93).

¹ location at <http://www.google.com/mars/#lat=-9.795677&lon=-64.248046&zoom=4>

Research task 2 - Diagnostic climate signatures of basalt alteration on Earth and Mars

The general idea of this research (which was not initially expected in this TEAM project, as indicated above) is to find an experimental method that would help identify past climate changes on Mars from instruments that could be placed onboard a future spacecraft and would characterize the type of alteration undergone by the basalts that constitute the crust. In an earlier work (Gurgurewicz et al., submitted to Journal of Geophysical Research – Planets) we have shown that the spectrometers designed to determine the mineralogy of the Martian surface from Mars-orbiting spacecraft (OMEGA/Mars Express, CRISM/Mars Reconnaissance Orbiter) are unable to achieve this goal (Figure 3).

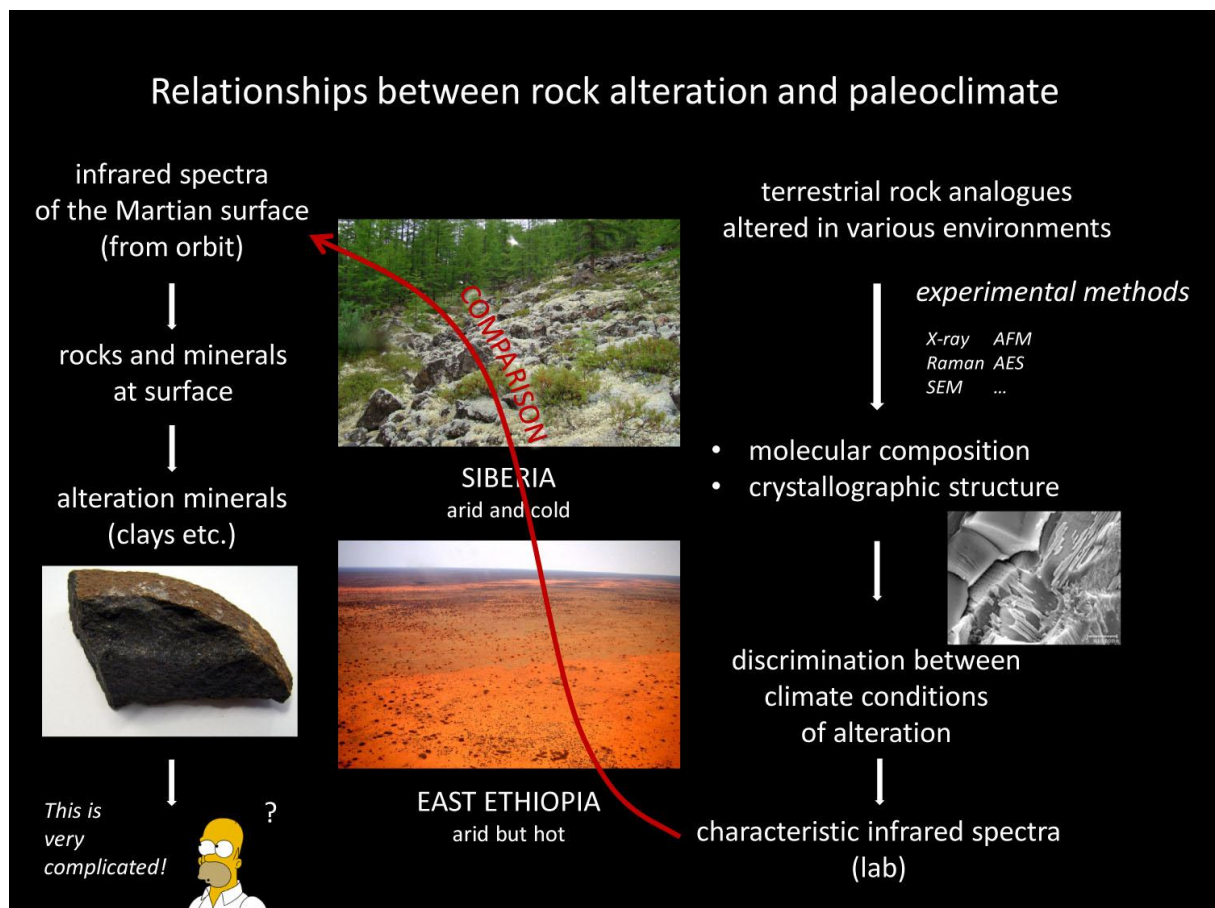


Figure 3. Task 2. How paleoclimate information can be schematically retrieved from alteration of basalts. The left column shows the inverse problem, which cannot be solved. The right column gives the direct problem, followed by our group.

The first step in this work is understanding and characterizing the difference in the alteration features of basalts placed in different conditions on Earth at nanoscale.

- Basalt samples altered in various conditions on Earth have been retrieved, including basalts altered in warm and dry conditions (eastern Ethiopia), cold and dry (southern Siberia), cold and wet (Iceland), and cool and wet (Possession Island, Indian Ocean).
- PhD student Marta Skiścim, who is a physicist, has been trained to some basic geology and soil science concepts.
- Many methods for studying nanosurfaces exist; the most promising for the near-future have been identified.
- Basalts are heterogeneous and porous rocks, far from the near-perfect nanoscale surfaces usually studied in experimental physics. Methods for optimum basalt sample preparation have been investigated.

Research task 3 – Deep-seated gravitational spreading on Mars and Earth

This task is the research topic of PhD students Olga Kromuszczyńska (TEAM member but not FNP stipendee) and Magdalena Makowska (FNP stipendee). OK's work is oriented toward analysis and geological interpretation of datasets from Mars-orbiting spacecrafts (Mars Global Surveyor, Mars Odyssey, Mars Express, Mars Reconnaissance Orbiter). MM's task is to perform numerical models of these observations to identify the physical mechanisms and processes involved in deep-seated gravitational spreading.

- Deep-seated gravitational spreading features have been characterized on Mars in a few areas (OK)
- From January to March, MM was trained to the geology of Mars and rock mechanics at ING PAN.
- On March 25 she was then sent to Montpellier for 2 months in order to be trained to numerical modelling.
- On March 28 she made a presentation of her research task in Montpellier (objectives, basic things and issues relating to Valles Marineris, available datasets and constraints, what are the expected results at the end of her PhD, and how she thinks they can be achieved).
- Between March 29 and April 30 she started familiarize with discrete element modelling under the guidance of Profs. Gueydan and Taboada in Montpellier. She will stay in Montpellier until May 24.

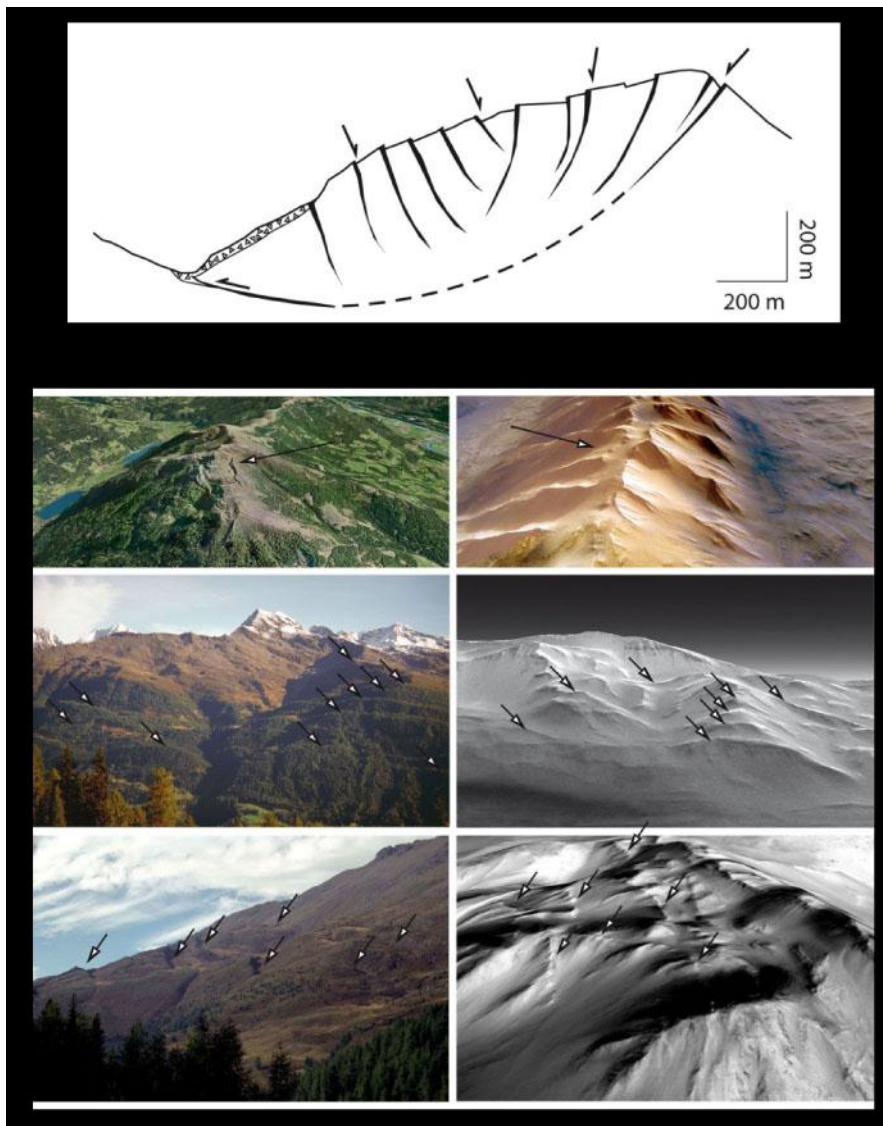


FIGURE 4. TASK 3. Investigation of the mechanisms of deep-seated gravitational spreading of topographic ridges. Top: Cartoon showing faults typically developing by deep-seated gravitational spreading of topographic ridges; lower left: examples in the Austrian Alps (courtesy J. Reitner for the two bottom photographs); lower right: examples in Valles Marineris on Mars (Mège and Bourgeois, 2011, Earth Planet. Sci. Lett. 310, 182–191).

Research task 4 – Landslides on Mars and Earth

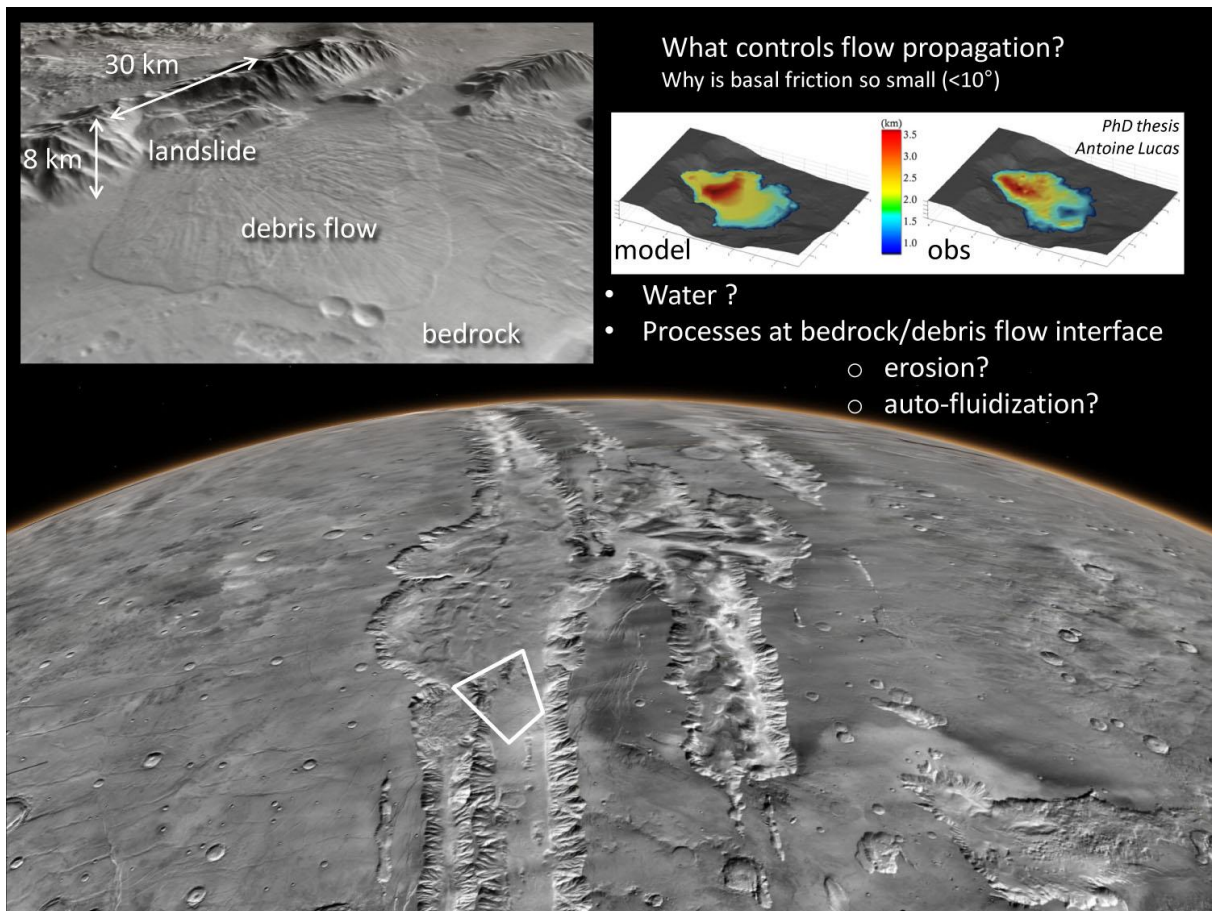


FIGURE 5. TASK 4. The processes at the bedrock/debris flow interface during landslides are not well known and are the topic of this task, investigated by granular physics modelling. The cartoon in the upper left illustrate one of the results obtained in Valles Marineris by Dr. Antoine Lucas, a former PhD student co-supervised by Anne Mangeney and Daniel Mège; now at Caltech (after Lucas et al. 2011, J. Geophys. Res. 116, E10001, doi:10.1029/2011JE003803). This task is a continuation of that work.

This topic aims at understanding the runout length of rotational landslides, which is systematically underestimated by existing models. Processes such as erosion at the bedrock/sliding mass interface (Figure 5) are being investigated using a granular flow code developed by Prof. Mangeney.

- Since January, PhD student Timur Borikov is studying this code.

- Between March 15 and May 13, he is working on code development in Paris under the guidance of Prof. Mangeney.

Research task 5 – Evolution of periglacial landforms on Earth and Mars related to global climate changes

This task mainly corresponds to the research project of postdoc researcher Antoine Séjourné (Figure 6). It is close to the research topics of some of our PhD students (tasks 2 and 3). AS was recruited 2 months after his PhD defence and is therefore writing papers (see his merit report). Task 5 is deepening some of the results he obtained his PHD thesis.

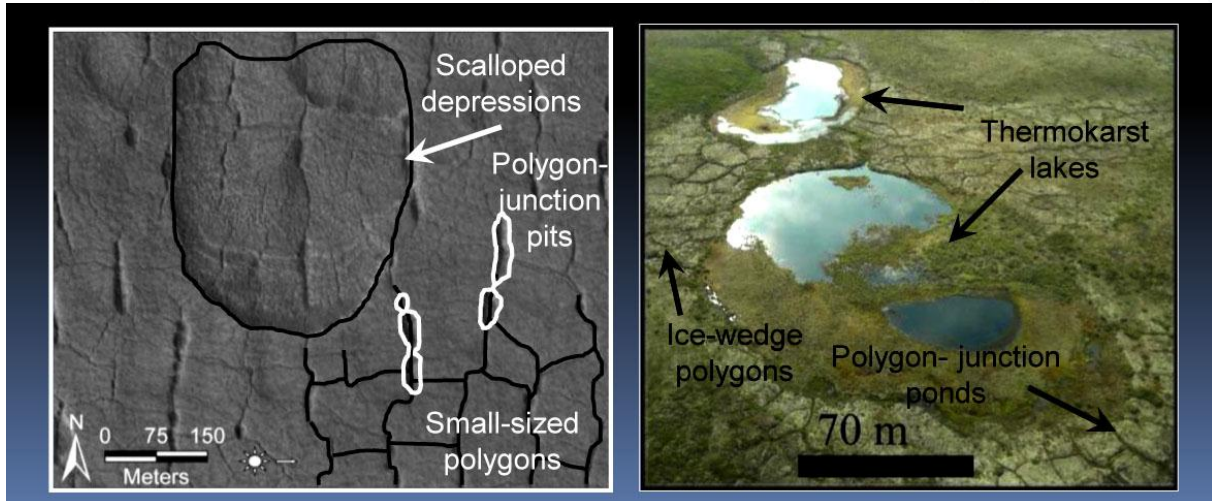


FIGURE 6. TASK 5. Periglacial landforms are common to Mars (left, Utopia Planitia, northern hemisphere) and the Earth (right, on the Tuktoyaktuk Coastlands, Canada). This task is to better understand the evolution of some periglacial features on Mars, especially periglacial polygons, from comparison with terrestrial polygonal features.

Research task 6. Ice processes and landforms

This task corresponds to the research project of postdoc researcher Marion Massé (Figure 6), and has implications for interpreting the results of experiments performed in Task 2.

Between February 13 to the end of the reporting period, Marion Massé was sent to the US for working with the scientists from the HiRISE camera experiment onboard the Mars Reconnaissance Orbiter spacecraft on one of the hottest topics currently discussed in the Martian geology community, the formation of liquid brines on Mars (see her merit report). Water is currently unstable at the surface of Mars, which raises questions regarding the origin and formation processes of the observed brine flows. During this period Marion has investigated the mineralogical composition of the brine deposits from reflectance spectra from hyperspectral orbital datasets.

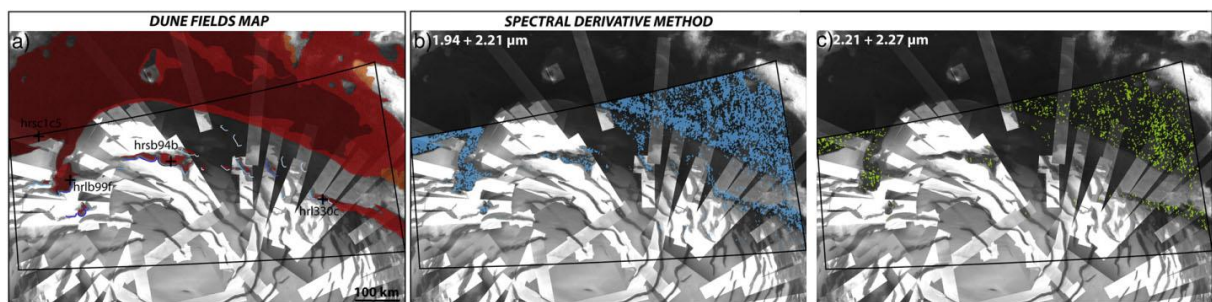


FIGURE 7. TASK 6. Example of relationships between geomorphology and glacial processes on Mars. Dune fields (red) observed around the polar cap ices (white spiral) contain abundant gypsum grains (blue and green) identified using two spectral criteria. The dunes originate from accumulation of gypsum-rich dust released by ablation of polar cap ice controlled by katabatic within the polar cap (Massé et al., Earth Planet. Sci. Lett. 317-318, 44–55).

b) Summary of the results of the research tasks.

Research Task 1 – Rheology of the Martian lithosphere

At the end of Period 2, all parameters have been identified and tectonic models are in place. The result of modelling is expected to match the tectonic models proposed though different results may prompt a re-think of these tectonic models.

Research task 2 - Diagnostic climate signatures of basalt alteration on Earth and Mars

Atomic Force Microscopy was identified as the priority method to be used to study the differences in alteration of basalts. Two methods for sample preparation were identified.

Research task 3 – Deep-seated gravitational spreading on Mars and Earth

Preliminary results of geomorphometry analysis of Martian datasets were presented at the Lunar and Planetary Science Conference in Houston. The scale of gravitational spreading on Mars was found to be an order of magnitude larger than on Earth. Discrete element modelling was found to be a useful method to investigate the processes and explain the development of the observed geologic features produced by gravitational spreading.

Research task 4 – Landslides on Mars and Earth

Code development is in progress.

Research task 5 – Evolution of periglacial landforms on Earth and Mars related to global climate changes

One article has been submitted to a national journal and another one is in progress for an international journal (see Séjourné's merit report).

Research task 6 – Ice processes and landforms

- The results indicate that the observed brine deposits observed at the surface of Mars are still forming at present.

- Experimental hydration and dehydration of basaltic soils wetted by brine solutions shows that the reflectance spectra are strongly affected by moisture content. Spectral evolution has been accurately determined. It has been presented at an international conference and is the topic of a paper in progress.

2) AWARDS AND DISTINCTIONS

A grant was awarded to our group by the embassy of France in Poland for contributing to scientific exchanges between our group and a French research laboratory. This grant was used for a two-month stay (March 15-May 13) of PhD student Timur Borikov with the Seismology Laboratory of Institut de physique du globe de Paris, where his co-supervisor Prof. Anne Mangeney is located.

3) INFORMATION ON MASTER'S THESES AND OTHER SCHOLARLY DEGREES OR TITLES

EARNED BY RESEARCHERS INVOLVED IN THE PROJECT as a result of the realization of the project (concerning team members who are not stipendees).

4) INFORMATION ABOUT PARTNERS

a) Description of the cooperation with foreign partners

University of Nantes, Planetology and Geodynamics Lab, France

- *Researchers from foreign partner:* O. Bourgeois, V. Carrère, A. Gaudin, S. Le Mouélic, Y. Morizet
- *Researchers from TEAM project:* Joanna Gurgurewicz, Marion Massé, Daniel Mège, and Marta Skiścim
- *Topic of cooperation:* on geology and mineralogy of Mars, as well as various issues relating to processing and interpretation of remote sensing datasets
- *New or established cooperation:* This partnership is established for many years.
- *Type of cooperation during this reporting period:* During this period collaboration was mainly in the form of continual email exchanges of ideas and data, and a few stays at University of Nantes by Marion Massé (during Period 2 but prior to her contract starting date) and Daniel Mège.

University of Paris-Sud, Orsay, France

- *Researchers from foreign partner:* François Costard, Julien Gargani
- *Researchers from TEAM project:* Antoine Séjourné, Marion Massé, Daniel Mège
- *Topic of cooperation:* periglacial morphology
- *New or established cooperation:* established for many years
- *Type of cooperation during this reporting period:* article writing, continual e-mail exchanges

University of Montpellier, Géosciences Montpellier Lab, France

- *Researchers from foreign partner:* Frédéric Gueydan, Alfredo Taboada
- *Researchers from TEAM project:* Fionn Cullen, Magda Makowska, Daniel Mège
- *Topic of cooperation:* co-supervision of 2 PhD students
- *New or established cooperation:* new
- *Type of cooperation during this reporting period:* Two-months stay of the two PhD students at University of Montpellier

Institut de physique du globe de Paris, France

- *Researchers from foreign partner:* Anne Mangeny
- *Researchers from TEAM project:* Tim Borikov, Daniel Mège
- *Topic of cooperation:* co-supervision of 1 PhD student
- *New or established cooperation:* Cooperation started in 2006 with co-supervision of another PhD student by A. Mangeny and D. Mège, Antoine Lucas (currently at Caltech)
- *Type of cooperation during this reporting period:* Two-months stay of a PhD student at University of Montpellier (funded by Embassy of France in Poland)

Lunar and Planetary Laboratory, Arizona State University, USA

- *Researchers from foreign partner:* Alfred McEwen
- *Researchers from TEAM project:* Marion Massé
- *Topic of cooperation:* Stability and mineralogical signature of brines on Mars under present conditions
- *New or established cooperation:* established (April 2011)
- *Type of cooperation during this reporting period:* 2.5-months stay at LPL (funded by LPL)

Division of Geological and Planetary Sciences, Caltech, Pasadena, CA, USA

- *Researchers from foreign partner:* Antoine Lucas
- *Researchers from TEAM project:* Olga Kromuszczyńska, Daniel Mège

- *Topic of cooperation*: High resolution stereo-derived digital topography of Mars
- *New or established cooperation*: established (2005)
- *Type of cooperation during this reporting period*: Lab work, provides digital elevation models Valles Marineris for PhD work

German Aerospace Research Centre (DLR), Berlin, Germany

- *Researchers from foreign partner*: Laetitia Le Deit
- *Researchers from TEAM project*: Joanna Gurgurewicz, Marion Massé, Daniel Mège
- *Topic of cooperation*: Mineralogical composition of the surface of Mars
- *New or established cooperation*: established (2004)
- *Type of cooperation during this reporting period*: writing papers and continual email exchange of ideas and data

Planetology and Astrophysics Institute, Joseph Fourier University, Grenoble, France

- *Researchers from foreign partner*: Pierre Beck
- *Researchers from TEAM project*: Marion Massé
- *Topic of cooperation*: Experimental modelling of ice stability and spectral signature on Mars
- *New or established cooperation*: new
- *Type of cooperation during this reporting period*: Laboratory modelling (two-weeks stay of M. Massé in December 2011)

Permafrost Institute, Yakutsk, Russia

- *Researchers from foreign partner*: Alexander Fedorov
- *Researchers from TEAM project*: Antoine Séjourné
- *Topic of cooperation*: Characterization of periglacial features and processes in Yakutia, Siberia
- *New or established cooperation*: established for several years
- *Type of cooperation during this reporting period*: article writing

Arkansas Center for Space and Planetary Sciences, University of Arkansas, USA

- *Researchers from foreign partner*: Vincent Chevrier
- *Researchers from TEAM project*: Joanna Gurgurewicz, Marion Massé, Daniel Mège, Marta Skiścim
- *Topic of cooperation*: experimental characterization of basalt weathering on Mars using terrestrial analogues
- *New or established cooperation*: new
- *Type of cooperation during this reporting period*: identifying the terms of future cooperation

b) Description of the cooperation with Polish partners – if applicable

Space Research Centre PAN, Warsaw

- *Researchers from foreign partner*: Marek Banaszkiwicz, Hans Rickman
- *Researchers from TEAM project*: Joanna Gurgurewicz, Daniel Mège
- *Topic of cooperation*: future exploration missions in which SRC PAN is involved, especially Mars; research project on early cratering of the inner solar system
- *New or established cooperation*: established (2010)
- *Type of cooperation during this reporting period*: frequent visits to SRC PAN (J. Gurgurewicz is also employed at SRC PAN, 1 week/month), joint presentations at an international conference during Period 3.

Faculty of Earth Science and Environmental Management, University of Wrocław

- *Researchers from foreign partner:* Joanna Kostylev, Wojtek Bartz
- *Researchers from TEAM project:* Joanna Gurgurewicz, Marta Skiścim
- *Topic of cooperation:* Petrographic analysis of basalt samples, preparation of basalt samples for analysis at the Institute of Experimental Physics (below); help in organization of exhibit at the XV Festival of Science of Lower Silesia in September 2012
- *New or established cooperation:* established for several years
- *Type of cooperation during this reporting period:* Laboratory work, preparation of the Festival of Science

Institute of Experimental Physics, Faculty of Physics and Astronomy, University of Wrocław

- *Researchers from foreign partner:* Leszek Jurczyszyn, Leszek Markowski
- *Researchers from TEAM project:* Marta Skiścim, Joanna Gurgurewicz, Daniel Mège
- *Topic of cooperation:* nanoscale characterization of basalt alteration
- *New or established cooperation:* new
- *Type of cooperation during this reporting period:* Daily cooperation through PhD student M. Skiścim, who is doing another PhD in this institute

Department of Geography and Regional Development, University of Wrocław

- *Researchers from foreign partner:* Piotr Migoń
- *Researchers from TEAM project:* Joanna Gurgurewicz, Olga Kromuszczyńska, Magdalena Makowska, Marion Massé, Daniel Mège, and Antoine Séjourné
- *Topic of cooperation:* periglacial processes and landforms on Earth and Mars
- *New or established cooperation:* new
- *Type of cooperation during this reporting period:* terms of cooperation (starting during Period 3) under discussion

5) IS THE PROJECT COMPATIBLE WITH THE HORIZONTAL POLICIES SPECIFIED IN ARTICLES 16 AND 17 OF COUNCIL REGULATION (EC) NO. 1038/2006 (I.E. THE POLICY OF EQUAL OPPORTUNITIES AND ENVIRONMENTAL PROTECTION, AND WHETHER THE PROJECT IS CARRIED OUT IN COMPLIANCE WITH THE PRINCIPLE OF SUSTAINABLE DEVELOPMENT)?

YES NO

If Community policies are not being followed, please provide an explanation as to what irregularities there have been and what remedial action has been planned and undertaken.

6) IS THE PROJECT BEING REALIZED ACCORDING TO THE SCHEDULE ATTACHED TO THE CONTRACT ?

YES NO

If the answer is NO, please provide an explanation:

7) ADDITIONAL INFORMATION

Other important information relevant to the project

Education and public outreach activities

- **XV Festival of Science of Lower Silesia²**: Participation to this festival next September has been the subject of intense preparation since Period 2. Our participation will include display of award-winning Polish Magma-2 Mars exploration rover from Białystok University of Technology³, of a prototype of one of the SRC PAN's soil penetrators, such as the one onboard the ESA's Rosetta mission (which will visit the 67P/Churyumov-Gerasimenko comet in 2014), various activities and promotional material, as well as lectures.

- **Web site**: Design and filling of our web site⁴ has started, and will be ready before the Festival of Science.

- **HiTranslate**: Since the end of April, the research group participates to the HiTranslate⁵ programme. The objective of this programme, led by Arizona State University, is to translate the captions of selected HiRISE images of the surface of Mars (very high-resolution orbital images – 30 cm/pixel) to as many languages as possible to help in the dissemination of knowledge of Mars science in classrooms and to the general, non-English speaking public.

Expenses

- For a mistake in the ING recruitment contracts, the two postdocs could not be hired in January as planned. Their ING and FNP contracts started on February 1st.

- Delays in procurement procedures and various issues resulted in shifts between expense categories during Period 2, and in delays in purchases such as softwares.

These issues will be detailed in an appendix that will be attached to the financial report.

² <http://www.festiwal.wroc.pl/2012/index.php>

³ see <http://www.marssociety.org/home/press/announcements/untitledpost-2> and <http://www.youtube.com/watch?v=a5-ppa7GBTo&feature=relmfu>

⁴ <http://wroona.ing.pan.pl>, accessed through <http://wroona.pl> for simplicity

⁵ <http://www.uahirise.org/epo/hitranslate>

I, the undersigned, hereby confirm that the information contained in the merit, periodic report (both electronic and paper version) are true. I am aware of the legal consequences of giving untrue information in a legally significant situation, as stated in article 271 of the Penal Code.

Appendixes to the merit report in the electronic version:

- Project realization indexes (on-line data base),
- Scientific Achievements of the Laureate and Stipendees (on-line data base),
- List of conferences and scientific exchanges,
- merit reports of the Stipendees.

Appendixes to the merit report in the hard copy:

- documents confirming the execution of payments of pension and retirement insurance premiums (for PhD students) – only in paper form.

Date:.....

Laureate Signature.....

Institution Stamp.....

TEAM PROGRAMME

LIST OF CONFERENCES AND SCIENTIFIC EXCHANGE ACTIVITIES

Attachment to merit report

Project title:	Mars: another planet to approach geoscience issues		
Reporting period	from 01/11/2011 to 30/04/2012	Period no.: 2	
Agreement no.:	TEAM/2011-7/9	holding from 01.09.2011 to 30.06.2015	
LAUREAT:	Daniel MEGE		

ATTENTION: the information given below should regard only the realization of the project in the reporting period indicated above.

1. CONFERENCES

1.1 Participation of persons involved in the realisation of the Project in national and international conferences:

NO.	NAME AND SURNAME	CONFERENCE TITLE	COUNTRY, CITY	DURATION OF STAY (DATES)		TITLE OF THE PRESENTATION	TYPE OF PRESENTATION (ORAL / POSTER)
				FROM	TO		
1.	Joanna Gurgurewicz	LPSC 43	USA, Houston	18/03/2012	24/03/2012	Inferring alteration conditions on Mars: Insights from near-infrared spectra of basalts from Siberia and East Africa.	poster*
2.	Olga Kromuszczyńska	LPSC 43	USA, Houston	18/03/2012	24/03/2012	Giant sacking scarps in Valles Marineris.	poster*
3.	Marion Massé	LPSC 43	USA, Houston	17/03/2012	24/03/2012	Nature and Origin of RSL: Spectroscopy and Detectability of Liquid Brines in the Near-Infrared.	poster*
4.	Daniel Mège	MRAV	Ethiopia, Addis Ababa	08/01/2012	24/01/2012	The Ogaden Dyke Swarm and other volcanic features of southeast Ethiopia.	poster*
5.	Daniel Mège	LPSC 43	USA, Houston	18/03/2012	24/03/2012	Dikes and linear troughs: new obserbations on the Somali Plate.	poster*

6.	Daniel Mège	PVMD	France, Toulouse	29/03/2012	31/03/2012	Dykes and linear troughs: new observations on the Somali Plate.	oral
7.	Antoine Séjourné	LPSC 43	USA, Houston	18/03/2012	25/03/2012	Degradation of the periglacial landscape of Utopia Planitia under global warming : comparison Earth-Mars.	poster*
8.	Antoine Séjourné	EGU 2012	Austria, Vienna	22/04/2012	27/04/2012	Formation and evolution of periglacial landforms in context of global warming: Application to Mars and Siberia.	poster

*The type of presentation is determined by the conference organizers.

EGU: European Geosciences Union General Assembly (www.egu2012.eu); **LPSC:** Lunar and Planetary Science Conference (www.lpi.usra.edu/meetings/lpsc2012); **MRAV:** Magmatic Rifting and Active Volcanism Conference (www.see.leeds.ac.uk/afar/new-afar/conference/conference.html); **PVMD:** Planetary Volcanism and Mantle Dynamics (www.obs-mip.fr/pvolc/index.php).

2. SCIENTIFIC EXCHANGE – other than conferences

2.1. Official international trips:

NO.	NAME AND SURNAME	SCIENTIFIC UNIT	COUNTRY, CITY	DURATION OF STAY		AIM OF THE STAY
				FROM	TO	
1.	Timur Borikov	Institut de Physique du Globe de Paris	France, Paris	15/03/2012	13/05/2012	Work with PhD co-supervisor Prof. Anne Mangeney, Head of Seismology lab at IPGP. Training to granular modelling with application to Martian and terrestrial landslides.
2.	Fionn Cullen	Géosciences Montpellier, University of Montpellier II	France, Montpellier	25/03/2012	24/05/2012	Work with PhD co-supervisor Prof. Frédéric Gueydan. Training to Finite Element Modelling of the rheology of the Martian lithosphere.
3.	Magdalea Makowska	Géosciences Montpellier, University of Montpellier II	France, Montpellier	25/03/2012	24/05/2012	Work with collaborators Profs. Frédéric Gueydan and Alfredo Taboada. Training to Discrete Element Modelling of slope stability on Mars.
4.	Marion Massé	Lunar and Planetary Lab, Arizona State	TEXAS, Austin	13/02/2012	30/03/2012	Collaboration with scientists from the science team of the HiRISE camera experiment (onboard the Mars Reconnaissance Orbiter spacecraft) on formation of liquid brines on Mars. Training to data processing using

		University				NASA's ISIS processing system (which will be extensively used in our research group)
5.	Daniel Mège	University of Nantes	France, Nantes	06/02/2012	16/02/2012	Collaboration with Profs. Véronique Carrère, Anne Gaudin, and Yann Morizet. Acquisition of hyperspectral data of terrestrial basalt samples for comparison with orbital hyperspectral data of the Martian surface.
6.	Daniel Mège	University of Montpellier	France, Montpellier	27/03/2012	28/03/2012	Science discussions with PhD co-advisors Profs. Frédéric Gueydan and Alfredo Taboada regarding the directions of work and methods used by TEAM PhD students Fionn Cullen and Magdalena Makowska
7.	Antoine Séjourné	-	Iceland	07/02/2012	09/03/2012	Geological field work: study of glaciers and glacial erosion, periglacial gullies and volcanic landforms for comparison with planet Mars.

2.2. Official domestic trips:

NO.	NAME AND SURNAME	SCIENTIFIC UNIT	COUNTRY, CITY	DURATION OF STAY		AIM OF THE STAY
				FROM	TO	
1.	Joanna Gurgurewicz	Institute of Geological Sciences PAN	Poland, Warsaw	03/04/2012	05/04/2012	Attendance of workshop organized by FP7/RegPot/Atlab project: "Elements and isotopes in the analyses of extraterrestrial and terrestrial materials"
2.	Olga	Institute of	Poland,	03/04/2012	05/04/2012	Attendance of workshop organized by FP7/RegPot/Atlab project: "Elements

	Kromuszczyńska	Geological Sciences PAN	Warsaw			and isotopes in the analyses of extraterrestrial and terrestrial materials"
3.	Daniel Mège	Space Research Centre PAN	Poland, Warsaw	02/12/2011	02/12/2012	Seminar for the Geoplanet research consortium PAN: Volcanism in the Solar System (1h)
4.	Daniel Mège	Institute of Geological Sciences PAN	Poland, Warsaw	13/12/2011	13/12/2012	Meeting between Institute of Geological Sciences and the Science Attachés of the embassies of France, Germany, and Italy, and a representative of the Polish Ministry of Science and Higher Education: Talk (30 min): Introducing the WROONA research group.
5.	Daniel Mège	University of Wrocław	Poland, Wrocław	07/01/2012	07/01/2012	Seminar: Volcanism in the Solar System, and introduction to the WROONA research group (1h).
6.	Daniel Mège	Institute of Geological Sciences PAN	Poland, Warsaw	03/04/2012	05/04/2012	Attendance of workshop organized by FP7/RegPot/Atlab project: "Elements and isotopes in the analyses of extraterrestrial and terrestrial materials"
7.	Antoine Séjourné	Institute of Geological Sciences PAN	Poland, Warsaw	03/04/2012	05/04/2012	Attendance of workshop organized by FP7/RegPot/Atlab project: "Elements and isotopes in the analyses of extraterrestrial and terrestrial materials"
8.	Marta Skiścim	FNP	Poland, Warsaw	29/03/2012	30/03/2012	Workshop on interdisciplinary grants. INTER Programme
9.	Marta Skiścim	Institute of	Poland,	03/04/2012	05/04/2012	Attendance of workshop organized by FP7/RegPot/Atlab project: "Elements

		Geological Sciences PAN	Warsaw			and isotopes in the analyses of extraterrestrial and terrestrial materials"
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2.3. *Guests invited in connection with the realization of the Project (national and / or foreign):*

NO.	NAME AND SURNAME	SCIENTIFIC UNIT	COUNTRY, CITY	DURATION OF STAY		AIM OF THE VISIT
				FROM	TO	
1.	Doris Breuer	DLR	Germany, Berlin	24/11/2011	26/11/2011	Recruitment of TEAM members and discussions for future collaboration with DLR Berlin
2.	Gaël Choblet	University of Nantes	France, Nantes	24/11/2011	29/11/2011	Recruitment of TEAM members and discussions for future collaboration with Planetology and Geodynamics Lab in Nantes
3.	Ernst Hauber	DLR	Germany, Berlin	24/11/2011	26/11/2011	Recruitment of TEAM members and discussions for future collaboration with DLR Berlin
4.	Piotr Migoń	University of Wrocław	Poland, Wrocław	25/11/2011	25/11/2011	Recruitment of TEAM members and discussions for future collaboration in the field of planetary geomorphology
5.	Stéphane Pochat	University of Nantes	France, Nantes	24/11/2011	29/11/2011	Recruitment of TEAM members and discussions for future collaboration with Planetology and Geodynamics Lab in Nantes