

**MEMO<sup>2</sup>: MEthane goes MObile – MEasurements and MOdelling**

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# MEMO<sup>2</sup> – 1<sup>st</sup> Progress Report

Period: 1 March 2017 – 28 February 2018

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## Deliverable 5.8

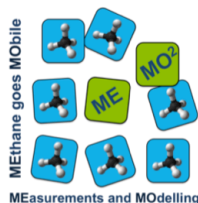
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Delivery month Annex I	13		
Actual delivery month	14 (in agreement with PO)		
Lead participant: UU	Work package: 5	Nature: R	Dissemination level: PU
Version: 1			

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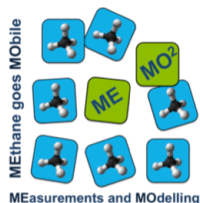


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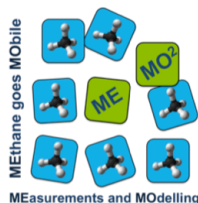
### Executive summary

The 1<sup>st</sup> Progress Report is submitted as deliverable D5.8. The report describes as an overview the general scientific progress of the project (per work package), but provides also individual ESR project reports in more detail.

The ESR reports are the responsibility of the ESRs and part of their training. Their contributions are attached as stand-alone reports.

Besides this the deliverable reports the administration of the action within the 1<sup>st</sup> reporting period (1 March 2017 – 28 February 2018).

The structure of the deliverable is based on the EU templates for reporting.



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# 1. General Progress of MEMO<sup>2</sup>

## 1.1 General progress of the Work Packages

Within the 1<sup>st</sup> reporting period, the consortium of MEMO<sup>2</sup> focussed on I) the recruitment of the 13 Early Stage Researcher (ESRs) and their training at the host institutions, and II) on first scientific activities, i.e. preparation and participation in measurement campaigns, and the set-up and development of instrumentation.

All ESRs started between project months 7 and 11. The ESRs got acquainted with their new scientific environment, and also interacted among each other through Skype calls. Work in the first month of their research mostly involved reading, writing detailed research plans, and receiving first (instrumental, methodological) training at their host institutions. They performed regional measurement campaigns in the surrounding of the host institute (e.g. around Utrecht, Heidelberg, Paris and in London), and made first experiments with the modelling tools.

In project month 12 the first intensive campaign took place in the area of Petten and around Alkmaar, associated to the 1<sup>st</sup> MEMO<sup>2</sup> school (both in detail described in the report on MS2). The activities included instrument comparison, a tracer release test, and detecting and quantifying CH<sub>4</sub> emissions from a variety of sources. All ESRs spent three days during the school / campaign to evaluate the data and present them to the participants. The data evaluation was continued after the campaign, and further improved results were presented by the ESRs during the 1<sup>st</sup> Annual Meeting in March 2018. A draft on the harmonization of measurement methods based on the results from the comparison campaign is in preparation (to be submitted as D1.5, due project month 18).

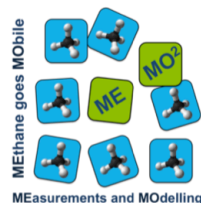
Within **WP 1 – Mobile measurements of CH<sub>4</sub>** (including primarily the ESRs 1-7 from the beneficiaries RUG, UVSQ, EMPA, UHEI, and LU) - preliminary tests for the lightweight sensor have been accomplished at **EMPA** on a bench-based system in order to characterize the dedicated custom-built, ring-shaped segmented multipass cell. A mechanically rugged and lightweight mobile measurement device was designed, with a very low overall weight of around 2 kg, which is suitable for the foreseen application on board a UAV. A prototype UAV AirCore has been successfully developed and tested by **RUG**. A validation flight that compares the UAV AirCore measurements and 60-m measurements was performed at the Lutjewad station. The first airborne measurement campaign using the **LU** aircraft is planned over a wetland during July or August 2018. Preparations for the campaign (contact to the authorities, application for a permit to fly over the national park area) have been started.

At **UVSQ**, the mobile platform (installation and measure) has been introduced to the ESR as well as the analysis tools to handle the data from the mobile measurements (R and python codes). Besides this a landfill (October 2017), a gas compression site and a farm (January 2018) were investigated.

UK mobile campaigns that will feed data to **WP2 – Source identification by isotopic characterization** (including primarily the ESRs 8 and 9 from UU and RHUL) - have been organized by **RHUL**, ongoing since the start of the MEMO<sup>2</sup> project. With the ESR 9 starting 2 months ago, only the results from the MEMO<sup>2</sup> school provide data directly to WP1 activities. A new LGR UMEA instrument, measuring methane and ethane, which distinguishes thermogenic gas from other methane sources, has been tested in the vehicle for the last 4 months. Data comparison between this ultraportable instrument and the high-precision Picarro instrument, sampling from co-located air inlets, has been made. In the Netherlands several locations were sampled by **UU**.

**UHEI, AGH** and **UVSQ**, although primarily belonging to WP1, organized also first campaigns (at e.g. a gas compressor station, dairy farm and a biogas plant, and at ventilation shafts located within the Southern Silesian Coal Basin) and investigated continuous measurement precision, short term and long term repeatability, and temperature and atmospheric pressure influence on two isotopic Picarro instruments.

Within **WP3 – Modelling: A multi-scale interpretation framework for CH<sub>4</sub> observations** (including primarily the ESRs 10 - 13 from the beneficiaries UU, WU, EMPA, and UVSQ) – the **WU** provided preliminary results from the MicroHH mode, available at the MEMO<sup>2</sup> school (see also report on MS10).



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The results were to get first insight in sampling strategies and as educational tool. This tool will form the basis of campaign planning, and the set-up of simplified tools (Gaussian Plume, RANS) for the evaluation of the measurements. It will be reported in D3.1 in detail (due month 24). On long-term different modelling techniques will be used to estimate emission fluxes from different kinds of sources (point, line, diffuse) in order to link measured concentrations of pollutants with emission fluxes.

The **UU**, responsible for the integration of mobile measurement data in the monitoring, reporting, and verification of key methane sources in the greenhouse gas emission reporting in Europe, started the interpretation of recent measurements on landfill emissions at three Dutch locations. **Empa** employed Lagrangian dispersion tools at the point source scale and European scale, and will focus in the upcoming period on the implementation of isotopic data from WP2, TNO emission inventories, and experiments with the inversion framework.

At **UVSQ** first forward simulations of CH<sub>4</sub> were performed with the CHIMERE chemistry-transport model using two emission inventories. The simulation output has also been compared to surface measurements of the World Data Center for Greenhouse Gases (WDCGG) dataset. In the coming period the focus will be on the I) implementation of <sup>13</sup>CH<sub>4</sub>, II) different tracers for different source categories, III) the comparison to ICOS and InGOS observations, and IV) higher resolution simulations and inversions.

**WP4 – Training** – involved all beneficiaries and non-academic partners of MEMO<sup>2</sup>. All activities scheduled in WP4 have started, i.e. all ESRs wrote their individual Career Development Plan (CDP) and the consortium organized the first network training events (theoretical and practical lessons, co-supervisions, the 1<sup>st</sup> MEMO<sup>2</sup> school, joint field campaigns, networking, and international training as e.g. first secondments and participation in conferences). The main highlight of the period was the organization of the 1<sup>st</sup> MEMO<sup>2</sup> school, as described above and in the report on MS2.

Within the WPs 1 – 4 no significant deviations from the initial work plan were made.

The **WP5 – Project Management** - and the work done are described in detail in chapter 4. Within **WP6 - Ethics** – two deliverables (D6.1 and D6.2) have been submitted. The ethical aspects of the project, with focus on the use of drones, were addressed and will be applied throughout the project lifetime.

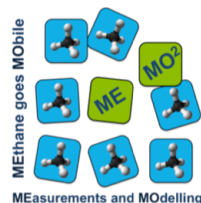
### 1.3 Deliverables

Within the first reporting period 9 deliverables were due, mainly administrative deliverables. Additionally to the due deliverables, the consortium started preparation and execution of upcoming deliverables. Table 1 gives an overview of all project deliverables and their actual status.

**Table 1:** overview of project deliverables and their actual status

#### Scientific Deliverables

No.	Deliverable Title	Lead	Due Date	Status*
D1.1	Lightweight CH <sub>4</sub> sensor and AirCore developed and deployed on UAV	RUG	24	In progress Preliminary tests for the lightweight sensor have been accomplished at EMPA on a bench-based system in order to characterize the dedicated custom-built, ring-shaped segmented multipass cell. A mechanically rugged and lightweight mobile measurement device was designed for application on board a UAV. The prototype UAV AirCore has been successfully developed and tested by RUG. A validation flight that compares the UAV AirCore measurements and 60-m measurements was performed at the Lutjewad station.
D1.2	Report / publication on CH <sub>4</sub> emissions from wetland and lakes in Sweden	LU	30	In progress The first airborne measurement campaign using the LU aircraft is planned over a wetland during July or August 2018.
D1.3	Report / publication of results from the campaign in Silesia	AGH	36	In progress Planning for the campaign in Silesia has started. Some MEMO <sup>2</sup> partners will participate in the CoMet campaign in May / July 2018 in Silesia. These experiences will be useful for a successful MEMO <sup>2</sup> campaign.
D1.4	Improved emission factors for different source categories from mobile measurements	UHEI	42	In progress First measurements on region CH <sub>4</sub> sources have started.
D1.5	Report on harmonized method for	UHEI	18	In progress

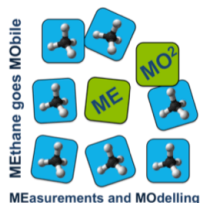


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	mobile CH <sub>4</sub> and <sup>13</sup> CH <sub>4</sub>			The measurement techniques used by different groups have been inspected and compared during the first campaign in Petten. A draft on the harmonization of measurement method is in preparation.
D2.1	Isotopic measurements linked to common scale	RHUL	18	In progress Cylinders being prepared for filling with gases to be circulated around isotopic measurement groups.
D2.2	Improved isotopic source signatures of local and regional CH <sub>4</sub> emissions	UU	36	In progress First measurements are planned / executed
D2.3	Publications on the use of isotopes for CH <sub>4</sub> source attribution in urban / industrial regions	RHUL	36	Not relevant yet
D2.4	Publication on temporal and meteorological influences on CH <sub>4</sub> at fixed sites	RHUL	42	Not relevant yet
D2.5	Report providing isotopic maps at grid scale from inventories and atmospheric measurements	UU	42	In progress First measurements are planned / executed
D3.1	New tools to estimate CH <sub>4</sub> source strengths from point sources, including mobile measurements	WU	24	In progress Tool includes passive tracer. Plans for the coming period include I) sample the model according to of different measurement strategies (drones, mobile vans, time series), II) include roughness elements that influence the dispersion of tracers, III) allow for flexible source distributions (landfills), and IV) simulation of various weather conditions.
D3.2	Improved bottom-up European CH <sub>4</sub> emissions	UU	30	In progress Currently the focus has been on landfill emissions, and analysis now works on the quantification of landfill emissions. Plans are to implement these new findings in the TNO MACC inventory.
D3.3	Forward modelling simulations of CH <sub>4</sub> and isotopologues	UVSQ	30	In progress CHIMERE simulations with different emission inventories have been performed. Next steps include the implementation of isotopologues and the comparison to observations of ICOS and InGOS.
D3.4	Top-down estimates of EU-scale CH <sub>4</sub> emissions	Empa	42	In progress First implementation of the local and EU scale Lagrangian modelling tools. Focus will shift now to the inversion framework.
<b>Management, Training, Recruitment and Dissemination Deliverables</b>				
D4.1	Individual Career Development Plan for each ESR	UVSQ	12	Submitted
D4.2	Annual update of the CDP for each ESR	UVSQ	24	In progress ESRs discussed the CDPs at the 1 <sup>st</sup> Annual Meeting (month 13). The first update of the CDPs will be initiated at the end of 2018.
D4.3	Two secondments for each ESR completed	UU	30	In progress First secondments have started, several are in preparation
D4.4	Two MEMO <sup>2</sup> schools organized	UU	30	In progress 1 <sup>st</sup> MEMO <sup>2</sup> school has been organized from February 5 <sup>th</sup> to February 16 <sup>th</sup> in Schoorl (the Netherlands), see report on MS2 2 <sup>nd</sup> School planned in project month 24, associated to the Mid-term Review Meeting
D4.5	Annual update of the CDP for each ESR	UVSQ	36	Not relevant yet The second update of the CDPs will be initiated at the end of 2019.
D4.6	Two conference participations for each ESR completed	UU	42	In progress First conference participations: IMM2017, EGU2018
D5.1	MEMO <sup>2</sup> consortium agreement	UU	1	Accepted
D5.2	Project Management Plan (PMP)	UU	6	Accepted
D5.3	Data management, Dissemination & Exploitation Plan (DDEP)	UU	6	Submitted
D5.4	Recruitment of ESRs finished	UU	9	Submitted
D5.5	Project meetings organized (UU, Empa, RUG, RHUL, UHEI)	UU	48	In progress First meetings organized: Kickoff (UU), 1 <sup>st</sup> Annual Meeting (Empa)
D5.6	Reports approved by Supervisory Board and sent to EC	UU	48	In progress
D5.7	Communication infrastructure established – interactive website including public dissemination	UU	6	Submitted
D5.8	Progress Report	UU	13	Submitted
D5.9	Mid-term Review Report	UU	22	Not relevant yet Preparation will start 3-4 month prior the Mid-term Review Meeting
D5.10	Supervisory Board of the network	UU	2	Submitted
D6.1	NEC – Requirement No.1	UU	6	Submitted
D6.2	EPQ – Requirement No.2	UU	6	Submitted

**\*Note:** The status "In Progress" may differ between this table and the status given in the ESR reports (in the attachment). This is due to the differing involvement of ESRs into the planning and execution of deliverables.



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#### 1.3 Milestones

Within the first reporting period the consortium achieved all 6 envisaged milestones. At the 1<sup>st</sup> Annual Meeting the consortium discussed and planned the upcoming milestones for the second period.

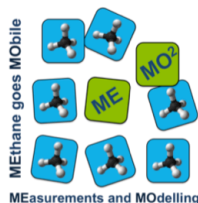
**Table 2:** overview of milestones in the project and their actual status

Nr.	Milestone Title	Lead	Due date	Status / Report
M1	ESRs trained at host institute with mobile equipment	UHEI	10	Achieved (see D5.8)
M2	First intensive campaign with training in the Netherlands	RUG	12	Achieved (report submitted)
M3	Workshop on Gaussian plume and dispersion models	UHEI	15	In progress The consortium decided on the 1 <sup>st</sup> Annual Meeting to organize M3 and M8 together (probably in project month 19)
M4	Lightweight CH <sub>4</sub> sensor and AirCore developed and deployed on UAV	RUG	24	In progress (see D1.1)
M5	Second intensive campaign in Silesia (Poland)	AGH	30	In progress MEMO <sup>2</sup> participated in two preparation campaigns of other projects (CoMET, FOAM)
M6	ESRs trained at host institute to measure/interpret isotope data	RHUL	12	Achieved (see D5.8)
M7	Comparative isotopic scale for project groups established	UU	15	In progress (see D2.1)
M8	Workshop on isotope measurement techniques and data interpretation	RHUL	20	In progress The consortium decided on the 1 <sup>st</sup> Annual Meeting to organize M3 and M8 together (probably in project month 19)
M9	Isotopic maps at grid scale produced from inventories and atmospheric measurements	RHUL	36	In progress (see D2.5)
M10	Large Eddy Simulation Tools ready for campaign & workshop	WU	12	Achieved (report submitted) MicroHH is open-source software that is documented online ( <a href="http://www.microhh.org">http://www.microhh.org</a> ). Web-pages include a wiki, bug-report, and an installation guide. A scientific publication describes the underlying science. This information is adequate for setting up and running the model. ESR11 will start working on specific MEMO2-relevant case studies, which will be documented and available for other ESRs.
M11	First updated CH <sub>4</sub> emission map EU	UU	30	In progress Currently the focus has been on landfill emissions, and analysis now works on the quantification of land-fill emissions. Plans are to implement these new findings in the TNO MACC inventory. ESR10 is in close contact with WU to use suitable modelling tools to derive emission strength from concentration measurements.
M12	Workshop on top-down emission estimates	UVSQ	30	Not relevant yet
M13	Two secondments for each ESR completed	UU	30	In progress First secondments have started, several are in preparation
M14	Two MEMO <sup>2</sup> schools organized	UU	30	Partly achieved 1 <sup>st</sup> MEMO2 school has been organized from February 5 <sup>th</sup> to February 16 <sup>th</sup> in Schoorl (the Netherlands), see report on MS2 2 <sup>nd</sup> School planned in project month 24, associated to the Mid-term Review Meeting
M15	Two conference participations for each ESR completed	UU	42	In progress First conference participations: IMM2017, EGU2018
M16	Communication infrastructure established – interactive website including public dissemination	UU	6	Achieved (report submitted)
M17	Planned recruitments completed and recruited fellows enrolled in PhD programme	UU	12	Achieved (see D5.4)
M18	Project meetings organized (UU, Empa, RUG, RHUL, UHEI)	UU	48	Partly achieved First meetings organized: Kickoff (UU), 1 <sup>st</sup> Annual Meeting (Empa)

## 2. Recruitment

The recruitment strategy, the organization of the recruitment process, and the selected candidates have been described in detail in deliverable D5.4, submitted in November 2017.





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## 2.1 Recruitment strategy

Based on experiences and requirements of the consortium, a decentralized recruitment strategy had been chosen already during the proposal-writing phase. Although MEMO<sup>2</sup> officially started in March 2017, the recruitment procedure started end of November 2016 to ensure an efficient and timely recruitment. The aim was to recruit all ESRs ideally within the first six months of the project. The following recruitment strategy had been implemented:

- Each beneficiary was responsible for the advertisement of and the recruitment on its own ESR position, supported by general advertisement by the coordinator. All advertisements were redirected to the project website, which was kept up-to-date regarding the positions.
- The coordinator provided a general project email ([management@h2020-memo2.eu](mailto:management@h2020-memo2.eu)). This email was used in all vacancies for submission of applications and contact email for applicants. Additionally, the individual PI email addresses were given in the advertisements to request more information about the positions.
- Applicants had to apply either directly via the general project email, or as requested by some partners (Empa, UU, LU) via an electronic submission system of the Human Resource (HR) departments. The application channels were clearly indicated in the advertisements.
- The coordinator collected all applications that came in via the general project email on Dropbox, a file hosting service offering e.g. cloud storage and file synchronization. For each ESR position an individual folder was created, with access only given to the responsible PIs for the respective ESRs. Applications which did not specifically address one of the positions were collected for access by all PIs.
- For monitoring reasons the coordinator got access to the electronic submission systems of the Human Resources departments of the respective beneficiaries Empa and LU.
- Each beneficiary was responsible to ensure the implementation of an open, transparent and comparable procedure following the European Code of Conduct. To ensure that all beneficiaries have the necessary information of these procedures, the “General Principles and Requirements for the Code of Conduct” (<http://ec.europa.eu/euraxess/index.cfm/rights/codeOfConduct>) were provided by email (23 November 2017) and an overview was given during the Kickoff Meeting (23 March 2017).
- The beneficiaries were solely responsible for the compliance with the EU eligibility rules and the selection of the best candidate, but in case of questions they were supported by the coordinator. Due to the planned intense collaboration between some beneficiaries and the non-academic mentors, some mentors were included in the selection procedure.
- All applications that were received until the deadline got full consideration. In the advertisements it had been mentioned, that the given deadlines in the job descriptions marked the start of the evaluation procedure followed by the selection procedure. Although the vacancy portals for individual positions were closed, eligible applications could be taken in consideration until the positions were filled, except LU. Applicants could contact the coordinator in case the deadline passed to get information about the status of individual vacancies.
- Beneficiaries who did not find a suitable candidate within the first round had the opportunity to reopen the recruitment procedure.

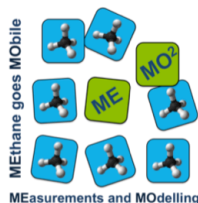
## 2.2 Advertisement

The vacant positions were advertised widely to ensure a maximum of visibility and awareness, both individually and grouped into a general MEMO<sup>2</sup> project advertisement. The advertisement started with the launch of the website in February 2017 and closed finally in October 2017.

The positions were advertised at several personal and professional platforms, websites, journals and mailing lists. The advertisements of individual projects were standardized as much as possible to ensure, that all applicants will get the same amount of information. This included a:




- Short description of the project
- Description of working conditions and entitlements, including career development prospects





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-  Short description of the selection process (selection criteria, selection committee, interview conditions, timeline, ...)
-  Deadline for application
-  Contact for applicants to get more information about the project







As the positions offered within MEMO<sup>2</sup> are highly diverse, the responsible PIs formulated individual criteria for selection based on the direction of the ESR projects. The coordinator consolidated all vacancy descriptions and published them on the project website. To ensure that applicants are aware of the EU eligibility criteria those were also added to the text of advertisement.

For each position, a deadline was set for application, and eligible applications until this date received full consideration. The deadlines marked the start of the evaluation procedure followed by the selection procedure. Although the vacancy portals for individual positions were closed then, late eligible applications were taken into consideration until the positions were filled, except for LU. Due to their recruitment policies, LU kept a strict deadline and took no applications into consideration after the deadline. In case no suitable candidates were found during the first round, the recruitment procedure was reopened (see Table 3 for the timeline of recruitment).









### 2.3 Selection criteria

The concept of MEMO<sup>2</sup> is to combine different methods, methodologies and approaches, e.g. the measurement of CH<sub>4</sub> by using different instruments, the development of different techniques or modelling of CH<sub>4</sub> emissions and related aspects. Due to the diversity of the ESR projects, the requested collaboration within an international consortium, and the proposed training programme within MEMO<sup>2</sup> the ESRs are expected to have several characteristics, talents and skills. This includes as well scientific as soft skills, such as:

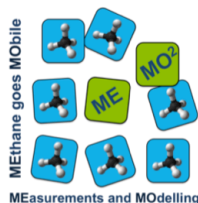
#### a) Scientific skills, e.g.

-  An excellent master's degree in physics, meteorology, environmental science, geosciences, analytical chemistry
-  Strong background, experience, and proficiency in environmental physics, including measurement of gas concentration (any technique: CRDS, GC, FTIR), calibration, general experimental techniques and data analysis tools.
-  Computational skills, programming, and statistical data mining, scientific coding skills, e.g. shell, Python, Fortran, Matlab, C/C++ or R equivalent to a minimum of 15 credits each
-  Knowledge and skills in atmospheric physics and chemistry, e.g. greenhouse gas analysis, stable isotopes / mass spectrometry, within the field of atmospheric boundary layer processes, atmospheric transport numerical modelling, data assimilation, biogeochemical cycles
-  Experience of fieldwork
-  Strong interest and skills in numerical modelling and programming

#### b) Soft skills, e.g.

-  Interested, devoted and highly self-motivated to work with state-of-the-art environmental research
-  Experience in scientific writing, such as publications, essays or equivalent in English
-  Being independent, creative, and able to work collaboratively inside and outside the consortium
-  Take responsibility for parts of the research project
-  Willingness to travel abroad for secondments and measurement campaigns
-  Willingness to present to an international research community
-  Excellent team players
-  A driving license for passenger cars is required

Applicants had to demonstrate ability, experience and potential of excellence by their CV, presentation, interview and references. EU eligibility - being an Early Stage Researcher and fulfilling the mobility rule - and scientific qualification were the main selection criteria, followed by the promise of high training efficacy, and the expected return. The applications of women and researchers from new EU member countries were particularly encouraged.



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Candidates that found not suitable for the project were rejected directly by the responsible PI or by the HR departments (Empa, UU, LU).

## 2.4 Interview procedure

The PIs responsible for the recruitment contacted the selected candidates via email, and shortlisted candidates were invited for an interview. The first interviews were mostly held by Skype, and if possible followed by a personal interview at the host location for the most promising candidates. The host institutions reimbursed costs for the interviews.

The selection committees were composed of normally 2 to 4 researchers, including the main supervisor and e.g. a member of the research groups, and for some beneficiaries also a representative of the HR department. During interviews, the candidates could present themselves, their background and their interest in the position. Following the interviews, the committees discussed the skills and matching of each candidate regarding the objectives of the positions and ranked them accordingly. The positions were offered to the candidate on the first position; in case the candidate waived the position it was offered to the candidate on the second position. In case that after the interviews none of the candidates was really convincing the committee, the position was reopened.

## 2.5 Timeline of the recruitment procedure

The consortium strove for finishing the recruitment within the first six months of the project. As this was very ambiguous, the advertisement procedure started already after the Grant Agreement had been signed by announcing the upcoming vacancies locally and in the personal networks. With the launch of the website (9 February 2017) the application procedure started officially as described above.

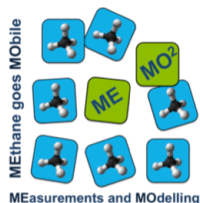
Although the project is of high relevance and positions were advertised widely, several positions attracted fewer applicants than expected and also the quality of applicants was beyond expectations. Therefore, the recruitment required more time than proposed, and for some positions a second selection round was necessary. Finally, the consortium found 13 highly motivated and qualified ESRs, which started between 1 August 2017 and 8 January 2018.

**Table 3:** Timeline of recruitment procedure

	Deadline 1 <sup>st</sup> round	Deadline 2 <sup>nd</sup> round	Candidate selected	Proposed start of employment
ESR1*	31 March 2017	15 October 2017	November 2017	1 January 2018
ESR2	15 March 2017	15 June 2017	July 2017	1 October 2017
ESR3**	1 May 2017		August 2017	16 October 2017
ESR4	15 March 2017		July 2017	1 August 2017
ESR5	30 April 2017		June 2017	1 October 2017
ESR6	31 March 2017		April 2017	1 September 2017
ESR7	31 March 2017	7 August 2017	August 2017	8 January 2018
ESR8	15 March 2017	31 July 2017	October 2017	15 November 2017
ESR9	31 March 2017	7 August 2017	August 2017	8 January 2018
ESR10	15 March 2017	15 April 2017	April 2017	1 September 2017
ESR11	31 March 2017		July 2017	1 September
ESR12	31 March 2017	31 August 2017	September 2017	1 December 2017
ESR13	30 April 2017		June 2017	1 October 2017

\* Please note: Promotion conditions include a decision of comparability by an examination board.

\*\* Please note: selected ESRs need to pass an exam taken by the faculty, mandatory to be accepted as a PhD student



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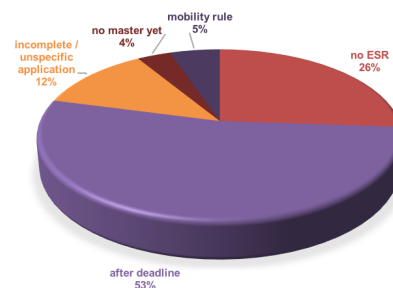
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## 2.6 Applications

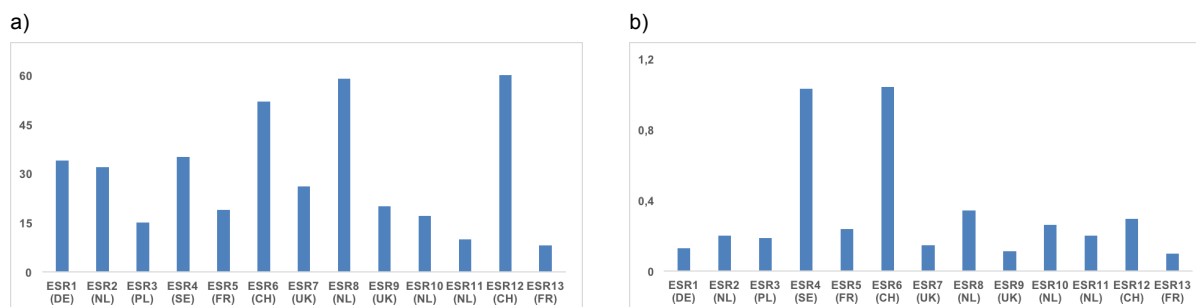
The consortium received 537 applications by 375 individual applicants in total, from more than 60 countries. 396 applications were eligible, from 259 individual applicants. 115 applicants could not be taken into account, mainly due to late submission either after the official deadline or when a respective candidate had been selected, and due to not fulfilling the EU eligibility criteria (Fig. 1).

The number of positions to apply to was not restricted. However, most applicants applied for just one (80 %) or two positions (11 %), only 5 % applied for more than three positions.

The number of eligible applications differed significantly between the offered positions (Fig. 2). On an absolute level, most applications came in for the positions in Switzerland and the Netherlands (Fig. 2a). Corrected for the number of days the positions were advertised (Fig. 2b), most applications per day were received for the positions in Switzerland and Sweden.



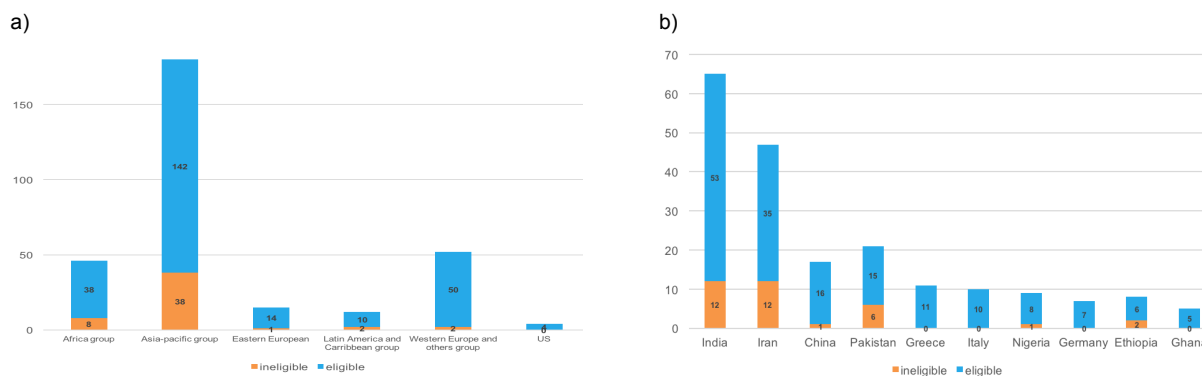
**Fig. 1:** Reasons why applications were formally not taken into account



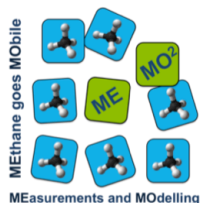
**Fig. 2:** a) Number of eligible applications per position, b) number of eligible applications per position and days advertised.

**Please note:** not for all applicants all information was given in the applications, as e.g. the country of origin, sex or age, so the absolute numbers in the figures can differ.

Approximately 25% of the applicants originates from Europe, the majority was from Asia (60 %) and Africa (15 %). Although applications from more than 60 countries were received, only a few countries dominated the picture, especially the number of applicants from India and Iran (Fig. 3).



**Fig. 3:** Country distribution of applicants, a) grouped by the classification of the United Nations: <http://www.un.org/depts/DGACM/RegionalGroups.shtml>, b) countries with highest number of applicants



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Regarding gender the overall number of applications was dominated by male, with a ratio of 2:1. This picture differs within the country groups (Fig. 4), where the ratio changed e.g. to 3:1 for the applicants from the Africa group or to 1:1 in the group of applicants from Eastern Europe. Relatively, the amount of ineligible applications was almost equally distributed between male and female.

As expected due to the EU eligibility rule regarding career stage, most applicants were between 26 to 30 years old (Fig. 5).

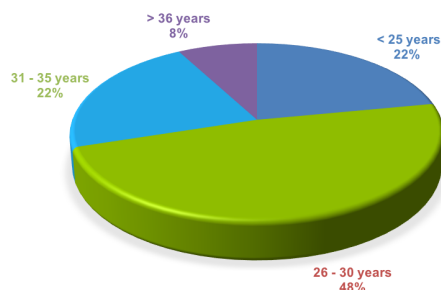


Fig. 5: Age of applicants

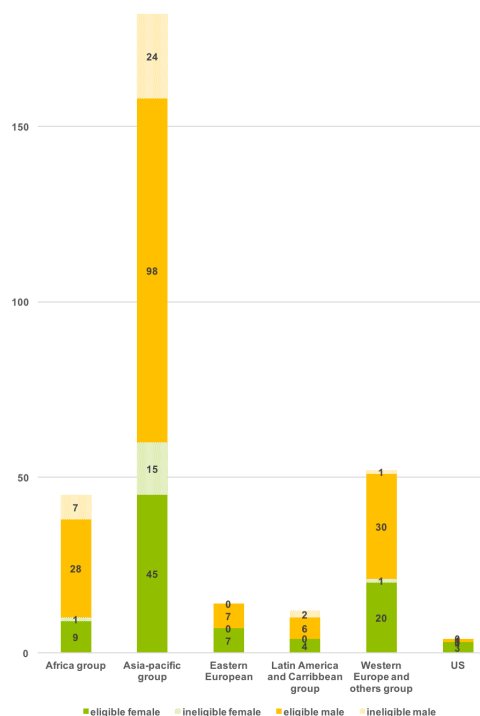


Fig. 4: Gender distribution of applicants within the country groups, including differentiation of eligible and ineligible applicants

**Please note:** not for all applicants all information was given in the applications, as e.g. the country of origin, sex or age, so the absolute numbers in the figures can differ.

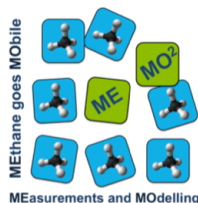
## 5.2 Selected candidates

As described above, MEMO<sup>2</sup> is a highly complex project requiring candidates, which are expected to have several characteristics, talents and skills. A high number of applicants did not show the necessary experience and background for the project and those applications could not taken into account. The majority of selected candidates for interview were still originating from Asia and Africa (45 %), but not as clearly dominating as in the overall group of applicants. Regarding gender 57 % of the invited applicants were male.

Although the majority of applications were received from countries belonging to the Asia group, particularly India and Iran, this is not mirrored in the country distribution of the selected ESRs (Table 4). The MEMO<sup>2</sup> ESRs represent in total 10 different countries whereas the majority originates from Europe, particularly Eastern Europe. The gender ratio of the selected ESRs does also not reflect the gender ratio of applicants, in total 8 female and 5 male researchers were recruited.

Table 4: overview of recruited ESRs

ESR	Hosting beneficiary	Name of candidate	Country of Origin	Gender	Co-supervising beneficiary	Mentor
ESR1	UHEI	Piotr Korben	Poland	Male	UU	SHELL
ESR2	RUG	Katarina Vinkovic	Croatia	Female	ECN	OONKEY
ESR3	AGH	Mila Stanisavljevic	Serbia	Female	UHEI	PGI
ESR4	LU	Patryk Lakomiec	Poland	Male	EMPA	AS
ESR5	UVSQ	Sara Defratyka	Poland	Female	RHUL	NPL
ESR6	Empa	Badrudin Stanicki	Germany	Male	RUG	UBA
ESR7	RHUL	Julianne Fernandez	US	Female	RUG	VIR
ESR8	UU	Malika Menoud	France	Female	RHUL	PIC
ESR9	RHUL	Semra Bakaloglu	Turkey	Female	UU	ISOP
ESR10	UU	Hossein Maazallahi	Iran	Male	TNO	AD
ESR11	WU	Anja Raznjevic	Croatia	Female	EMPA	WHIF
ESR12	Empa	Randulph Paulo Morales	Philippines	Male	UVSQ	ECN
ESR13	UVSQ	Barbara Szenasi	Hungary	Female	WU	PIC



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## 3. Career Development Plan

The Career Development Plan (CDP) is a deliverable of the project, and requires an annual update as it is a living document (D4.1 (month 12), D4.2, (month 24) and D4.5 (month 36)). The CDPs are confidential and are only for the members of the consortium and the Commission Services. The aim of the Career Development Plan (CDP) is to help PhD students to define and update their professional projects on the short (1yr) and longer terms and to have a strategy to acquire the missing skills to fulfil their objectives.

At the beginning of the project a template Career Development Plan (CDP) had been created, based on the EU template and templates used at the host institutions. Each ESR was provided with the template and was requested to prepare her / his individual CDP. The first versions of the individual CDPs were submitted as deliverable D4.1.

At the 1<sup>st</sup> Annual Meeting, held in month 13, the CDPs were discussed and / or updated together with the supervisors, co-supervisors and if possible with the non-academic mentors. Those ESRs, which mentors could not join the 1<sup>st</sup> Annual Meeting were asked to contact their mentors, discuss, and update their CDPs.

## 4. Management of MEMO<sup>2</sup>

The management of MEMO<sup>2</sup> is organised based on the Grant Agreement and the Consortium Agreement. The project structure and the management of it will follow the approach described in Chapter 3.2 of the GA, Part B, and the CA. The GA and the CA were provided as a hardcopy to all participants of the Kickoff Meeting and are also available in digital form for all participants. They provide the basis for the management of MEMO<sup>2</sup>.

The project management, implemented by the UU as coordinating beneficiary and organized within WP5, provides scientific and administrative coordination of the project according to the EU requirements and facilitates communication within the consortium and also between the consortium and external stakeholders, e.g. the European Commission. The project management is responsible for regular reporting to both. In close collaboration with the consortium the project management will ensure the dissemination of results inside and outside the consortium and also the maintenance of the website for internal and external exchange of information. The tasks as described for WP5 are:

Task 5.1: administrative, contractual and financial project management

Task 5.2: scientific project management

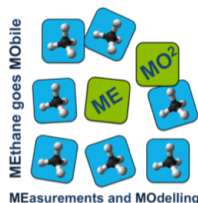
Task 5.3: network meetings

All tasks started in officially in project month 1 and are ongoing. The day-by-day task implementation is described in detail in the Project Management Plan (PM plan), submitted as deliverable D5.2 and the Data Management & Dissemination and Exploitation Plan (DMDE plan), submitted as deliverable D5.3. Both plans are living documents. During the annual meetings the consortium will decide, whether and which adjustments are necessary to ensure an effective and efficient project management over the course of the project and update the PM plan and the DMDE plan accordingly.

During the 1<sup>st</sup> Annual Meeting the consortium decided that no changes of the PM plan are necessary, and that the DMDE plan will be updated regarding some minor issues on data exchange and data quality, keywords and metadata. A suggestion on these topics will be done by UHEI and further discussed in the coming period. An updated version of the DMDE plan will be send to the EC.

### 4.1 1<sup>st</sup> Reporting Period

Within the first reporting period of MEMO<sup>2</sup> only small changes or adjustments were made, with no significant impact on the project, neither scientifically nor administratively.



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#### 4.1.1 Risk assessment and faced difficulties

In the first reporting period we faced two risks, but with no significant impact on the project. A detailed overview of possible risks is described in Chapter 7 of the Project Management Plan (submitted as deliverable D5.2).

**Risk 1:** The ESR recruitment took longer than expected, but was still on schedule. In project month 9 all ESRs were selected. However, the initial planning of the secondments started already from month 6 of the project, as this was the envisaged begin date of the ESRs in the proposal. Therefore, the secondment schedule will be structurally postponed.

**Risk 11:** One of the PIs (Felix Vogel, UVSQ) left the consortium to start at ECCC (Environment and Climate Change Canada). The ESR supervision was taken over by the former colleagues, and besides this ECCC was added as a new partner organisation to the consortium. Felix Vogel will still be involved in the supervision, and all ESRs of the consortium have the opportunity to take additional secondments to ECCC.

Difficulties were faced on organisational administrative level. At RHUL one of the ESRs (originally from Turkey) needed an Schengen Visa additional to the UK work visa, which caused extra travel and time. The recruitment procedure at AGH includes a PhD examination by the respective department. Without passing it, a student cannot be hired as a PhD. As the examination is only once a year, this was a critical issue in the recruitment procedure. Besides the examination the ESR hired at AGH (originally from Serbia) faced the problem that all official documents including the working contract are only in Polish. Her supervisor translated all relevant contracts and instructions, as also most of the administrative staff only speaks Polish. Here the National Contact Points (from Poland and also Serbia) were contacted and could help to solve the situation. The students at UVSQ faced similar problems. The contract was also only offered in French; however, some general information was given in English. Here also the supervisors helped with translations.

#### 4.1.2 Consortium

The initial consortium has not changed during the first reporting period. All 9 beneficiaries and 13 partner organisations are actively involved and part of the consortium. Due to the commitment indicated in the proposal some partner organisations were more active in the first reporting period as others, e.g. by supervising ESRs, organising network events, giving advice or access to their properties (TNO, ECN, Shell, Picarro, Afalzgorg, PGI).

As mentioned in chapter 4.1.1, ECCC has been added as a new partner organization. Additionally, GEOMAR was included as a partner organization. As oceans are significant contributors to the CH<sub>4</sub> budget, but not included in the project, the consortium decided at the Kickoff Meeting that it would be beneficial for both sides to also add the marine part of the CH<sub>4</sub> story to the project. Adding additional partner organisations was accepted by the project officer.

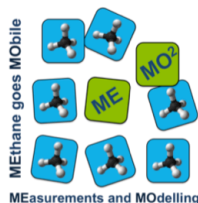
#### 4.1.3 Meetings

As MEMO<sup>2</sup> requires a high level of collaboration, regular meetings were implemented right from the beginning and on all levels within the consortium. If possible, meeting dates were chosen by consensus (using the date finder “doodle”) to ensure participation of as much partners as possible. In case this is not possible, the meeting organiser decides in agreement with the management. The meeting organisers were asked to prepare minutes from their meetings and provide them to the project management.

**I) Consortium Meetings:** Within the first reporting period one Consortium Meeting was held, the MEMO<sup>2</sup> Kickoff Meeting (23 and 24 March 2017), hosted by the coordinator (UU). All beneficiaries and 7 out of 13 partner organisations participated and showed a high level of commitment and interest in the project.

The first day focussed in the introduction of the beneficiaries and partner organizations, and the expertise and scientific profile of each participant. The leaders of the scientific WPs gave a general overview of the status of the WP and the involved partners, including first results and previous data that are relevant for the project. In addition to the scientific discussion all participants got a general overview of





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the main administrative tasks and responsibilities by the project manager and had the opportunity to discuss relevant questions with the financial administrative of the UU, Pieter Thijssen. As several non-academic partners join the consortium, they gave a brief introduction about their organisation and commitment in the project. A joint dinner closed the first day.

The second day focussed on planning concrete steps for the first year. The status of the recruitment procedure and the received applications was discussed in the consortium. Afterwards the training elements as defined in the GA were presented and discussed, also ideas about dissemination and exploitation strategies and the use of social media were exchanged. In addition, the consortium discussed the upcoming sampling campaigns and the organisation of them.

At the beginning of the second reporting period the 1<sup>st</sup> Annual Meeting of MEMO<sup>2</sup> was held (22 and 23 March 2018, <https://www.researchgate.net/project/MEMO2-MEthane-goes-MOBILE-MEasurements-and-MOdelling/update/5abc8ef24cde269658662413>), hosted by Empa in Dübendorf, Switzerland. 34 participants (all ESRs, all supervising PIs, 4 non-academic partner organisations (Shell, Picarro, Afalzburg, PGI), 3 external scientific advisors (M. Heimann, A. Vermeulen, C. Sweeney) were updated about the progress the project made within the first reporting period and discussed the planning of the second period. Besides this the ESRs discussed their CDPs face-to-face with supervisors and co-supervisors, and if present, with their non-academic mentors. Before the official meeting, the local organisers offered the opportunity to visit the research station at Jungfraujoch. The station for e.g. meteorology, glaciology, spectrometry, or geophysics is one of the highest European measurement stations and frequently used by researchers from all over the world. The visit was highly appreciated by the ESRs. At the end of the meeting the external scientific advisors evaluated the project and supported the consortium in its future planning. An overview of the evaluation is given in chapter 4.1.6.

**II) 3-monthly tele-conferences:** The consortium held three tele-conferences, starting three months after the Kickoff Meeting. The first tele-conference was held by using the telephone-based platform Powwownow. As this platform was not suitable due to technical problems for some partners (security reasons) and also high costs, the consortium decided to switch to the internet-based platform WebEx. This platform has been proven to be suitable for all participants and will be used in the future. Dates were picked by using the date finder “doodle”, with at least 5 suggestions regarding day and time.

During the tele-conferences the WP leader gave brief overviews about the status of their work packages and the involved partners, and the participants discussed the main relevant issues for the upcoming months, e.g. status of recruitment, planning of measurement campaigns, the organisation of the MEMO<sup>2</sup> school or upcoming administrative tasks as deliverables and their contributions.

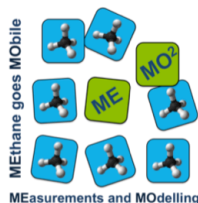
**III) ESR skype meetings:** The ESRs were right from the beginning encouraged to held regular Skype meetings. This is working well. Independently from the PIs or the coordinator, they set up an ESR council, with two chairmen for a period of 5 months, responsible for organising the ESR meetings (envisaged one meeting per month, with at least 9 ESRs present). The chairmen are also responsible for making the minutes and send them to the management. During the meetings, the ESRs exchange information, and discuss relevant issues such as campaigns or data exchange. In case input or information is requested from the ESRs, e.g. for planning network events or reporting, this is communicated by the management to the respective ESR chairmen and discussed within the ESR meetings. The ESR group vice versa can request relevant information from the management.

**IV) WP meetings:** All WP leaders were asked to organise regular WP meetings with the PIs involved in their WP. Initially this was planned bi-monthly. As the WPs have a close email contact and also in combination with the regular 3-monthly tele-conferences, the need for bi-monthly WP meetings is not given and the frequency is more on request.

**Table 5:** overview of MEMO<sup>2</sup> meetings

Meeting	Date / Location	Organizer	Work Package	Participants
Kickoff Meeting	23–24 March 2017, Utrecht, The Netherlands	UU	All	All project participants
1 <sup>st</sup> Annual Meeting	21 – 22 March 2018, Dübendorf, Switzerland	Empa	All	All project





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				participants
Tele-Conferences	15 June 2017 15 September 2017 13 December 2017	UU	All	Representatives of all beneficiaries and partner organisations
WP Tele-Conferences	On request of WP leader	Respective WP leader	Respective WP	WP participants (PIs + ESRs)
ESR Tele-Conferences	14 November 2017 14 December 2017 13 March 2018	ESRs	All	ESRs

#### 4.1.4 Communication Activities

##### 4.1.4.1 Communication infrastructure

The communication infrastructure has been described in detail in deliverable D5.7. According to the spatial distribution of the consortium, the day-by-day communication within the consortium is assured mainly remote by email. The chosen communication channels, structure and frequency worked well during the first year, all participants are responsive and engaged, and the management received requested information without problems. Within the consortium all communication channels are available for any participant, the communication lines are short and direct with dedicated responsibilities (see D5.2 and D5.3 for more details) but no formal restrictions. The direct communication with the Project Officer as a representative of the EU as funding agency is restricted to the coordinator.

Communication channels are

**I) Email, telephone:** The main communication channel according to the spatial distribution of the consortium is email. A dedicated project email has been created ([management@h2020-memo2.eu](mailto:management@h2020-memo2.eu)) as contact for external requests, initially setup via the Dutch company GetHost, but moved later on to the ICT service of the UU. Individual exchange of information use the institutional email addresses of the participants. Email is also the preferred channel for official project communication to ensure traceability of information and decisions. Besides emailing, phone calls are used as communication channel.

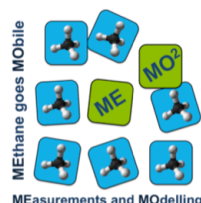
**II) Web-based board meetings and tele-conferences:** Direct and regular exchange between participating groups and boards increases collaboration and reduce the risk of failing of the project. High-frequent face-to-face meetings are not manageable due to geographically reasons. They are costly and also causing unnecessary environmental pollution, thus participants are invited to participate in regular remote board meetings. The meetings are planned by either using *Skype* as a web-based platform for meetings with only a few participants or *WebEx* for consortium meetings. The platform *powwownow* (<https://www.powwownow.co.uk>), a telephone-based platform has been proven as not suitable.

**III) Face-to-face meetings:** For the consortium the mandatory face-to-face moments are the annual meetings. The meetings are organized by dedicated beneficiaries as indicated in the Grant Agreement, and communicated via email and the project website. At the annual meetings ESRs will present the progress of their work, meet with (co-)supervisors and mentors, and the consortium will discuss project related issues.

**IV) Participant Portal** (<https://ec.europa.eu/research/participants/portal/desktop/en/home.html>): The Participant Portal is the web portal of DG Research & Innovation and the entry point for electronic administration of EU-funded projects. The Participant Portal hosts the services for managing projects throughout their lifecycle. The coordinator will use the Participant Portal for general project managing.

The beneficiaries have to use the EU Participant Portal for individual beneficiary related reporting or documentation issues, e.g. financial reporting or submission of researcher declarations.

**V) MEMO<sup>2</sup> website:** The project website of MEMO<sup>2</sup> (<https://h2020-memo2.eu>) was planned to serve as a central communication platform within and outside the consortium, and for dissemination of project relevant information, including documents (e.g. GA, CA, deliverables, minutes), templates, and results. The website was launched two months before the official start of the project and is maintained



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by the coordinator, with input from all participants.

Due to a significant delay in transferring the website from a commercial host to the ICT service of the UU in November 2017, this is lacking behind. At the moment dropbox is used for sharing documents, with future shifting to B2DROP or a comparable service as dropbox is limited for the purpose of data exchange. The website will be updated and expanded in the upcoming months. Sensible information will password protected and only available for project participants. All participants are encouraged to use the website for information exchange. Visitors of the website will find general information about the project and its objectives, overviews of relevant scientific results and short report summaries, newsletters and fact sheets.

**VI) Social media, newsletters, factsheet:** Social media such as LinkedIn, ResearchGate and Twitter were setup to be used as a general communication channel towards the broader public. LinkedIn and ResearchGate had been started already 5 months before the official start of the project and were also used for advertising the project vacancies. Social media are also a channel to inform about network activities open to the public, e.g. conference sessions, and disseminate project related news. The coordinator is responsible for the maintenance of the accounts and updating, and all participants are encouraged to contribute by sending information or links to the coordinator. Newsletters and fact-sheets will address the broader public, generated by the coordinator and supported by input from the participants.

#### 4.1.4.2 Dissemination activities

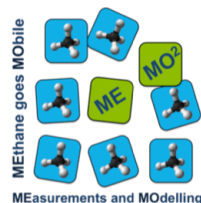
Within the first reporting period, the project was introduced to the scientific community and the broader public by using the above mentioned communication channels as the MEMO<sup>2</sup> website and social media accounts. A first newsletter about campaign activities and network events was published in December 2017. Although the ESRs were recruited only in the second half of the first reporting period and therefore no scientific results were produced, the project was presented already at the EGU2017 in Vienna and the PEFTEC2017 in Antwerp (<https://www.researchgate.net/project/MEMO2-MEthane-goes-MOBILE-MEasurements-and-MOdeling/update/5a26bd3ab53d2f0bba41dad6>).

Especially during the PEFTEC2017, MEMO<sup>2</sup> was introduced intensively, mentioned in several talks and poster discussions. The conferences were also used to advertise the non-filled ESR positions. The next dissemination activities are planned at the EGU2018, including several scientific and administrative posters (e.g. poster 8034, 7406), a workshop (SC3.13) and a public splinter session, where probably three ESRs will present their projects (SMP1).

Table 6 shows the first dissemination activities of MEMO<sup>2</sup>, which will be intensified during the next reporting period.

**Table 6:** Dissemination activities of MEMO<sup>2</sup>

Nr.	Conference name	Location	Date	Presentation [oral / poster]	Title of presentation	Authors / Conveners	Public	Link
1	EGU 2017	Vienna, Austria	24-28 April 2017	Poster	MEMO <sup>2</sup> : Methane goes MOBILE – MEasurements and MOdeling – Part 1	Walter, S., Röckmann, T., and the MEMO <sup>2</sup> team:	yes	<a href="http://meetingorganizer.copernicus.org/EGU2017/EGU2017-13442.pdf">http://meetingorganizer.copernicus.org/EGU2017/EGU2017-13442.pdf</a>
2	EGU 2017	Vienna, Austria	24-28 April 2017	Poster	MEMO <sup>2</sup> : Methane goes MOBILE – MEasurements and MOdeling – Part 2	Röckmann, T., Walter, S., and the MEMO <sup>2</sup> team	yes	<a href="http://meetingorganizer.copernicus.org/EGU2017/EGU2017-15754.pdf">http://meetingorganizer.copernicus.org/EGU2017/EGU2017-15754.pdf</a>
3	EGU 2017	Vienna, Austria	24-28 April 2017	Splinter meeting SMP6	MEMO <sup>2</sup> : Methane goes MOBILE – MEasurements and MOdeling	Walter, S. and Röckmann, T.	yes	<a href="http://meetingorganizer.copernicus.org/EGU2017/session/25151">http://meetingorganizer.copernicus.org/EGU2017/session/25151</a>
4	Industrial Methane Measurement Conference – PEFTEC 2017	Antwerp, Belgium	29-30 November 2017	oral	Short duration, high precision methane flux measurements: Implications for annual CH <sub>4</sub> emission reporting and CH <sub>4</sub> mitigation strategies	Denier van der Gon, H., Arzoumanian, E., Bouchet, C., Jonkers, S., Kelly, R., Morin, D.	yes	<a href="https://www.ilmexhibitions.com/peftec/methane-conference/">https://www.ilmexhibitions.com/peftec/methane-conference/</a>
5	Industrial Methane Measurement Conference – PEFTEC 2017	Antwerp, Belgium	29-30 November 2017	oral	Identification and validation of methane sources using carbon-13 measurements	Fisher, R., Lowry, D., Zazzeri, G., al-Shalaan, A., France, J., Brownlow, R.	yes	<a href="https://www.ilmexhibitions.com/peftec/methane-conference/">https://www.ilmexhibitions.com/peftec/methane-conference/</a>



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6	Industrial Methane Measurement Conference – PEFTEC 2017	Antwerp, Belgium	29-30 November 2017	oral	Validating methane measurement techniques	Robinson, R.	yes	<a href="https://www.ilmexhibitions.com/pefttec/methane-conference/">https://www.ilmexhibitions.com/pefttec/methane-conference/</a>
7	Industrial Methane Measurement Conference – PEFTEC 2017	Antwerp, Belgium	29-30 November 2017	oral	Methane source attribution: Methane and ethane analysis using a portable battery-powered Picarro Cavity Ring-Down spectrometer	Winkler, R.	yes	<a href="https://www.ilmexhibitions.com/pefttec/methane-conference/">https://www.ilmexhibitions.com/pefttec/methane-conference/</a>
8	Industrial Methane Measurement Conference – PEFTEC 2017	Antwerp, Belgium	29-30 November 2017	oral	A new technique for detecting gas emissions and estimating the locations and mass emission rates of sources	Hirst, B., Randell, D.	yes	<a href="https://www.ilmexhibitions.com/pefttec/methane-conference/">https://www.ilmexhibitions.com/pefttec/methane-conference/</a>
9	Industrial Methane Measurement Conference – PEFTEC 2017	Antwerp, Belgium	29-30 November 2017	poster	Methane source distribution in the complex landscapes of the United Kingdom: isotopic characterisation, seasonal variation and inventory validation	Lowry, D.	yes	<a href="https://www.ilmexhibitions.com/pefttec/methane-conference/">https://www.ilmexhibitions.com/pefttec/methane-conference/</a>
10	Industrial Methane Measurement Conference – PEFTEC 2017	Antwerp, Belgium	29-30 November 2017	poster	MEMO <sup>2</sup> : MEthane goes MOBile - MEasurements and MOdelling	Walter, S., Röckmann, T.	yes	<a href="https://www.ilmexhibitions.com/pefttec/methane-conference/">https://www.ilmexhibitions.com/pefttec/methane-conference/</a>
11	Industrial Methane Measurement Conference – PEFTEC 2017	Antwerp, Belgium	29-30 November 2017	poster	Isotopic composition of methane from exhausts of mines and gas fields in South Poland	Necki, J., Zimnoch, M., Jasek, A., Chmura, L., Lakomic, P., Korben, P., Wolkowicz, W.	yes	<a href="https://www.ilmexhibitions.com/pefttec/methane-conference/">https://www.ilmexhibitions.com/pefttec/methane-conference/</a>

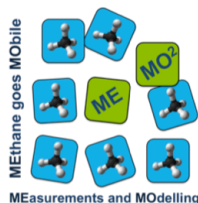
#### 4.1.5 Impact of the Action

##### 4.1.5.1 Impact on ESRs

The project and its network activities shows first impact on the career of the ESRs: they are introduced to a highly interdisciplinary training program and get acquainted with techniques to identify CH<sub>4</sub> emissions in the atmosphere (WP1), attributed emissions to various source categories (WP2) and quantified such emissions from the local to the European scale (WP3). They performed first state-of-the-art measurements and developed modelling approaches. Table 7 gives an overview of planned and already executed secondments, which impact the career of the ESRs not only by increasing their professional knowledge, but also their networking and complementary skills. As mentioned above, the secondment schedule as described in the Grant Agreement needs some adjustments due to the late recruitment of several ESRs to ensure them as efficient as possible for the ESRs.

**Table 7:** Overview of executed and planned secondments

Nr. ESR	Secondment Executed (1 <sup>st</sup> Reporting period)	Secondment Planned (2 <sup>nd</sup> Reporting Period)
ESR1		
ESR2	ECN (October 2018 – February 2019 (5 months)	EMPA (October 2019)
ESR3	PGI (short preparation visit 18.10 to 20.10.2017)	UHEI, UU
ESR4	-	EMPA (Autumn 2018)
ESR5		
ESR6		
ESR7	-	RUG (provisionally October 2018)
ESR8		
ESR9	-	UU (provisionally October 2018)
ESR10		
ESR11	-	EMPA (23/03/2018 – 27/04/2018)
ESR12	-	UVSQ (October 2018)
ESR13	WUR (19 February 2018 – 19 March 2018)	TNO (1 month)



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As shown in the CDPs the ESRs planned their short- and long-term career, which aims on maximising the impact of the network training.

Besides their work on their individual projects, the ESRs started to work together as a group. This is clearly visible by the self-organisation of their Skype meetings, which are independent from the PIs (see chapter 4.1.3).

#### 4.1.5.2 Impact on visibility

As described in chapter 4.1.4.2, the consortium actively disseminated MEMO<sup>2</sup> as a project and is searching for contacts outside the consortium. These activities will go on in the second period and intensified as soon as the ESRs can present their first scientific results. We are also fostering that ESRs will present their results and also their general project activities towards a broader public, e.g. by regular blogs. This was already planned in the proposal and had been discussed at the first annual meeting.

The presentation of the project by the website, which is an important channel towards the broader public, is lacking behind. This issue will be tackled within the next months.

#### 4.1.5.3 Impact on scientific collaborations

Within the first year the MEMO<sup>2</sup> consortium was quite active in presenting the project and participating in scientific activities as several measurement campaigns. By this MEMO<sup>2</sup> fostered the intersectoral exchange inside the consortium and initiated several collaborations outside the consortium, which will be intensified in the next reporting period. The main scientific collaborations are:

##### I) Participation in the CoMET campaigns

In August 2017 18 scientists from DLR (Germany), KIT (Germany), AGH (Poland) and RUG (Netherlands) performed the CoMET Silesia pre-campaign as a joined effort. This was the first measurement campaign, where MEMO<sup>2</sup> participated. The aim of the campaign was to investigate CH<sub>4</sub> emissions from co-located mines in the area of Jastrzębie Zdrój city, Poland. Four mines with seven exhaust shafts were sampled, with several activities in parallel, e.g. FTIR analysis of XCH<sub>4</sub> concentration, Air-core CH<sub>4</sub> analyses with cross-sections of plumes, ground base mobile measurements with Picarro close to the exhaust shafts and in background area, and a dozen of drone flights downwind the Pniówek V coal-mining shaft.

End of May 2018 the CoMET 1.0 campaign is scheduled, covered by DLR Germany and ESA. This campaign will be a test of the Sentinel 5 platform equipment on strong sources, and MEMO<sup>2</sup> will again participate with several partners.

##### II) Participation in the FOAM campaign

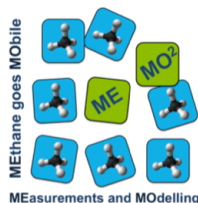
The FOAM campaign in October 2017, where also scientists of MEMO<sup>2</sup> were involved, was a EUFAR TNA campaign devoted to the measurements of plumes from mine shafts and other sources by using a small Cessna aircraft. The aircraft was equipped with Picarro and HySpex analysers. Results are in progress and will be shown in the next MEMO<sup>2</sup> newsletter, scheduled in June 2018, and on the social media accounts of the project.

##### III) Build up collaboration with EDF (USA)

A first contact was made with Daniel Zawalla from EDF USA. Several MEMO<sup>2</sup> participants (e.g. RHUL, USQV, and ECCC) were involved in by EDF USA submitted and recently by UNEP funded project CCAC, which show an obvious and strong link with MEMO<sup>2</sup>. Due to limited resources as time and budget, a participation in the planned measurement campaigns might probably not be possible, but the ESRs have the opportunity to collaborate by exchanging results and experiences.

##### IV) Build up collaboration with EDF Europe

During the Antwerp industrial methane conference MEMO<sup>2</sup> made a first contact with EDF Europe (via Michael Donatti and William Dow). EDF Europe is interested to measure CH<sub>4</sub> emissions in Romania, As the reported methane emissions from oil and gas in Romania are higher than anywhere else in



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Europe, this might also be an interesting target area for the MEMO<sup>2</sup> consortium.

#### 4.1.6 Evaluation of the Action by the external Supervisory Board (SB)

The external Supervisory Board (SB) was invited to participate to the 1<sup>st</sup> Annual Meeting and was asked to evaluate the progress of the first year. Martin Heimann (MPG-BGC, Jena), Colm Sweeney (NOAA, Boulder), and Alex Vermeulen (ICOS, Lund) were present during the two days. Gabrielle Petron (NOAA) could unfortunately not participate due to personal reasons. The Supervisory Board was asked to submit a more detailed joint review report, which will be forward to the EC.

All relevant documents, e.g. Grant Agreement and deliverables were provided in advance and individual progress of the project was demonstrated at the first day of the meeting. At the end of the meeting the SB gave an overview of its impression of the project and discussed future planning with the consortium.

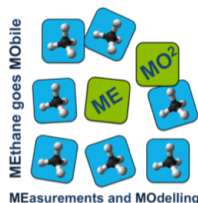
As a brief overview, the SB stated that the project shows good progress despite delays in ESR recruitment, with impressive results from the measurement campaign executed in February. The campaign provides a good groundwork; next steps for upcoming campaigns should be the formulation of clear scientific questions and a detailed method selection. The consortium should discuss the scientific focus and a definition of one or a few “Flagship” project(s). MEMO<sup>2</sup> includes many different technological and scientific advances covering the development and application of mobile platforms, isotope studies and modelling. While each of these activities represent state-of-the-art and are novel and exciting, the project would profit by defining already early in the project lifetime a few (1-3) “flagship” projects which ties in all the different project WPs and project partners. Given the expertise of the entire project consortium, these projects could provide substantial visibility, not only in the scientific domain, but also in the wider climate mitigation policy arena, and could lead to a few key publications in major journals. Defining these early in the project lifetime would allow for sufficient planning. Examples could be a revisit of quantification of CH<sub>4</sub> emissions from a major Silesian coalmine or coalmine field using the full toolset as developed in the project. Alternative hot-spots could be the emissions from a particular city, an important wetland/lake complex, a poorly known geological source or a region with high emissions from ruminants.

In the proposal mapping the road to new top-down based pan-European CH<sub>4</sub> emissions estimates based on the new MEMO<sup>2</sup> information is envisaged. To reach this goal, quite a few steps have to be designed and planned out: it is a very long way from detailed CH<sub>4</sub> emissions from a few Dutch farms to the livestock CH<sub>4</sub> emissions from Europe as a whole. Especially the spatial and temporal representation of the emission drivers need to be carefully addressed. It does not suffice e.g. to claim that the EDGAR database is not good – what is the alternative? Since the up scaling of detailed source information and the complementary downscaling by the top-down method are major steps towards this goal it would be good develop early in the project a road map detailing the various steps of how this goal will be achieved later in the project. This document could also define the characteristics of a base case scenario (spatial/temporal resolution, domain, target time period) so that contributing work by the different groups can be focused.

Regarding dissemination and outreach activities, progress / campaign / project blogs written by young scientists have proven to be very useful. Written in a language understandable for a wider audience, these allow the reader to witness “science” as a human enterprise. Examples are the blogs in the German CarboPerm project: (<http://www.carboperm.net/index.php?id=blogs>) or the INTAROS project: (<http://www.intaros.eu/stories/>). The website as one of the main outreach channel should be updated as it is lagging a bit behind. Further (scientific) training activities for the ESRs could be e.g. writing an extensive literature review by each ESR.

The societal impacts of the project are a strong point of it, this could be intensified. Besides this, MEMO<sup>2</sup> should strengthen its link to external projects and organisations, e.g. IG3IS or ICOS.




The DMP should be adjusted at some points. The consortium should study data licences and prepare to choose one. Besides this discovery metadata are not well covered (ISO19115/INSPIRE/Dublin Core). Data formats are part of interoperability, proprietary formats are deprecated (e.g. excel). An internal data sharing solution is urgent and critical for success.



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The consortium highly appreciated the input of the SB and will work on the comments and suggestions within the next period. Several points of interest were discussed and first steps were already taken and initiated.

-  Collaborations with other projects, e.g. ICOS, and contact to international organisations such as EDF were already initiated. These will be intensified and extended, and new collaborations are envisaged.
-  The update of the DMP will include an update on data harmonisation and data quality. This topic was intensively discussed during the 1<sup>st</sup> Annual Meeting and in progress. UHEI is currently working on a suggestion how to implement it into the day-by-day data handling, also in close collaboration with ICOS.
-  The website has been transferred completely to the UU and will be updated within the upcoming months.

## 6. History of the deliverable

Table 3: Deliverable history

Version	Author(s)	Date	Changes
1	Sylvia Walter	19 January 2018	Template of ESR report sent to ESRs and PIs
	Sylvia Walter	2 March 2018	Deadline ESR contributions
	Sylvia Walter	26 March	ESR contributions rejected and ESRs informed about resubmission deadline (5 April 2018)
	Sylvia Walter	8 April	First version sent to coordinator