

FREEWAT

FREE and open source software tools for WATer resource management

Local courses to build capacity at national level

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Abstract

The present report details the training activities developed in the Task 3.3 Local courses to build capacity at national level, carried out in the framework of the H2020 FREEWAT (FREE and open software tools for water resource management) project. FREEWAT is an open source and public domain GIS integrated modelling environment for the simulation of water quantity and quality in surface water and groundwater with an integrated water management and planning module.

The purpose of the Task 3.3 was to build capacity at national level. The trainers formed in Task 3.2 used the training materials, delivered in D3.2, to demonstrate the FREEWAT platform capabilities through national courses in their own country to relevant stakeholders. According to the project, a total of 890 individuals had to be trained. About 650 people needed to be directly trained to the use of the platform within the EU, 60 in Switzerland, 100 in neighbouring countries (Ukraine and Turkey) and another 80 in Africa (in South Africa, Namibia and Botswana) thanks to the involvement of UNESCO-IHP. As such, courses need also to be held in Switzerland at IST-SUPSI or collaborating universities premises.

The Task 3.3 has been successfully accomplished: 1.076 participants attended 44 national courses and 2 remote courses. Three additional courses, not foreseen in the Grant Agreement (GA), were run and documented in this report. These 49 courses were performed in 53 countries spread out over the 5 continents.

The participants positively evaluated FREEWAT platform capabilities. The training courses were well balanced and provided a comprehensive insight on the software. Comments and suggestions were gathered about the software requirements to connect FREEWAT with other specific software (i.e. unsaturated zone) and to include the software in the teaching curricula of universities.

Comments and suggestions helped to improve the software use experience as long as the User Manuals and the Tutorials. The overall conclusion is that scientific software technologies (as the FREEWAT software) are useful tools for water management. Private companies and public institutions demonstrated a strong interest in using the FREEWAT software as well as academic ones for teaching purposes.

This report provides an overview of the activities/courses, a brief analysis of participating organisations and the summarised findings (of trainers and trainees) on conducted courses. The report is rounded off with the main conclusions. The facts and findings from individual courses are presented in Annexes A - G. These annexes also contain signed attendance lists and consent forms, as well as questionnaires filled out by course participants.

1 Introduction

FREEWAT is an open source and public domain GIS integrated modelling environment for the simulation of water quantity and quality in surface water and groundwater with an integrated water management and planning module. FREEWAT aims at promoting water management and planning by simplifying the application of the Water Framework Directive and other EU water related Directives.

Specific objectives of the FREEWAT project are:

- to coordinate previous EU and national funded research to integrate existing software modules for water management in a single environment into the GIS based FREEWAT;
- to support the FREEWAT application in an innovative participatory approach gathering technical staff and relevant stakeholders in designing scenarios for the proper application of water policies

The Work Package (WP) 3 of the FREEWAT project is entirely dedicated to build knowledge and capacity on using scientific software technologies (FREEWAT platform), and aimed at improving the professional level of technical and managerial personnel involved in Water Resource Management issues in public institutions and companies (stakeholders of the project). After the Preliminary training (Task 3.1) and the Training the Trainers (Task 3.2) activities, Task 3.3 was about delivering local courses to build capacity at national level.

According to Grant Agreement (GA), during the Task 3.3 about 650 people had to be directly trained to the use of the platform within the EU, 60 in Switzerland,100 in neighbouring countries (Ukraine and Turkey) and another 80 in Africa (in South Africa, Namibia and Botswana) thanks to the involvement of UNESCO-IHP and IGRAC. Total number of individuals to be trained was then 1.046. Moreover, as far as the African context, teaching materials about the background and current situation of the Stampriet aquifer based on the Governance of Groundwater in Transboundary Aquifer (GGRETA) project was prepared by IGRAC.

This report details the training activities developed in the Task 3.3. The report provides an overview of the activities/courses, a brief analysis of participating organisations and the summarised findings (of trainers and trainees) on conducted courses. The report is closed by the main conclusions.

The report has 7 Annexes, each of them containing outcomes of the trainings provided by one of the 14 project partners, namely: SSSA, UNESCO, METCENAS, AMALTEA, IEI, ERU, NTUA/AMDC, INGHA, UTARTU, TSNUK, PARAGON, BUGS, IST_SUPSI and CSIC. Each partner has provided an Activity Report on training activities, including information on course organisers, locations, dates, participants, course structure (including its program) and participant suggestions and comments.

Each partner report has the following annexes:

- Annex A. Activity Reports for all the Task 3.3 local courses (enclosed at the end of this document)
- Annex B. Participant Lists (signed) from all the Task 3.3 local courses
- Annex C. Consent Forms (signed) about participation in FREEWAT local courses
- Annex D. Confidentiality Agreement from all the Task 3.3 local courses (signed; these documents are provided only for courses before the release of the software in April 2017)
- Annex E. Questionnaires from all the Task 3.3 local courses (feedbacks from the training courses)
- Annex F. Additional training performed outside the local courses performed during Task 3.3
- Annex G. All institutions involved in Task 3.3 (including institutions from the additional training)

Since confidentiality ceased to be relevant during the project execution in April 2017, not all participants were requested to sign the confidentiality agreement (Annex D). Nevertheless, the signed Confidentiality Agreements were collected and presented in the partner report's annexes.

Since AMALTEA hold the trainings prior the request for questionnaires was issued and the template provided, AMALTEA collected the impressions (suggestions/comments) from participants verbally during the trainings and afterwards by phone and mails. This information was summarized in their activity report.

The following chapter contains the overview of the conducted courses, a brief analysis of participating organisations and the summarised findings (of trainers and trainees) on conducted courses.

2 Methodology

All the partners trained in Task 3.2 (around 100 attendees), provided a five-days applied training course (repeated from two to three times) in their own country to demonstrate the FREEWAT capabilities to relevant stakeholders. As per the project, we expected average classes of 16 to 24 participants, in order to reach a number of 60 individuals to be trained on average per country.

The methodology to perform Task 3.3 activities was decided by the Steering Group (SG) and WP3 leader and explained on September 28th - 29th of 2016, during the project Mid-Term Meeting held in Paris, together with all the FREEWAT project partners. In synthesis, the requirements to fulfil the Task were:

- Each case study partners will have to perform Task 3.3 as stated in the GA;
- IGRAC, as Task 3.3 leader, will monitor the progresses in Task 3.3 supported by IDAEA-CSIC and SSSA;
- Average classes have to be between 16 and 24 participants. As such, minimum average participants agreed in the GA are of 60 persons per partners;
- Each case study partner will have to perform a five days training (one week) to be repeated three times in order to reach the expected number of participants;
- The SG asked that training days are divided in maximum three days of remote training followed by at least a two days face-to face course;
- In order to reach maximum impact, the SG suggests that the trainers organize and move to different part of the country (i.e. having the course given at three different locations);
- Partners may not be able to reach the stated (60) number of participants. In this case, two options are foreseen: 1) they can use the budget to organize a course in a country not included in FREEWAT; 2) part of their budget to perform such activity will be passed to another partner part of their budget will be advocated to partners able to train more participants;
- IGRAC will send a monitoring sheet in order to track partners' capabilities (in term of number of people potentially trained) and ways of undertaking the training;
- IGRAC will provide partners with a presentation letter for H2020 FREEWAT and description of the activity foreseen in Task 3.3 to be signed by each participant to Task 3.3 and a registration sheet (including training dates, name and surname, e mail, institution, type of institution of each participant):

- Giving the present available training material, each partner will have the freedom to decide which part of the FREEWAT training material develop and provide based on its national conditions;
- IGRAC will send a sheet to track the status, partners not replying after a third call to provide required data, will be considered defaulting and their activities and related budget will be shifted to other partners guaranteeing to perform the activity;
- Trainees have to be, among the others, PhD students/post-graduate MSc/professionals, technical staff at public authorities and so on;
- Giving the fact that present MSc students may be the future users of FREEWAT, a maximum of 1/3 of the whole training group can be constituted by MSc students in each country;
- If a number of students is taken from a university course, this must be declared, still MSc students will have to sign the participation sheet and the Consent Form;

Remote training activities were run by partner SSSA and IDEAE-CSIC. SSSA launched a call for FREEWAT remote training in LinkedIn groups in October 2016. More than 100 individuals asked to be involved. Courses started in November 2016 and ended in June 2017. Regarding CSIC training activities, thanks to the LinkedIn Spanish group and the project website, 6 persons were involved in the remote training, mostly from South America. Outcomes of these courses are provided in Chapter 3.

To ensure the widest dissemination of the local courses activities and their schedules, this information was distributed through the FREEWAT website (<u>http://www.freewat.eu/freewat-courses</u>), Twitter and LinkedIn media.

3 Summary of the courses, analysis and findings

This chapter provides a detailed overview of the training courses conducted by the project partners: courses done by each project partner and consequently the percentage of involvement institutions' type involved. As said before, the mean of these courses is to divulgate the FREEWAT platform at national level, therefore, in order to achieve it, 46 courses were held (44 regular courses and 2 courses performed remotely). Additionally, 3 courses were held as additional training by some project partners.

Furthermore, the information provided in this chapter is complemented by the Annexes:

- Annex A Activity Reports from Local Courses
- Annex B Participant Lists (signed) from Local Courses
- Annex C Consent Forms (signed) about participation in FREEWAT
- Annex D Confidentiality Agreement (signed)
- Annex E Questionnaires (feedbacks from the trainings)

• *Annex F* Additional Training describes the courses performed outside the local courses, as agreed by the partners involved

• Annex G Institutions Involved in Task 3.3

These annexes contain, not only the activity report done by each project partner detailing information about the courses (course's structure, remarks/suggestions by the attendees, among others), but also, the questionnaires given to the participants in order to get the feedback between the users and the developers in charge of improvements.

3.1 Summary of the courses

The local courses started in January 2017 and the activity finished in September 2017. In general, all the courses had the same structure which was 2 days face to face and 3 days remotely. Some local courses, under particular circumstances, had different structure than the one, for example 5 days entirely face to face.

Table 1 shows all the main information about all the local courses performed ordered by dates. While 44 courses were performed 2 days face-to-face and 3 days online, in general, two courses were performed totally online (performed by SSSA and CSIC) with technical assistance during the courses.

JANUARY:						
nº Course	Partner	Date	Location	Course structure	Course language	Part. Num.
1	UTARTU	January 24 - March 8	Tallinn, Estonia	2 d f2f 3 d online	Estonian	37
2	AMALTEA	January 30-31	January 30-31 Madrid Spain 2 d f2f 3 d or			31
-	7467421274	,				0.
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FEBRUAR	I.	Data	Location	Courses atomations		Doot Ma
n° Course	Partner	Date	Location		Course language	Part. No.
3	AMALTEA	February 13-14	Valladolid Spain	2 d f2f 3 d online	Spanish	18
4	IST_SUPSI	February 13-14	Lugano, Switzerland	2 d f2f 3 d online	English	28
5	AMALTEA	February 21-22	Zaragoza Spain	2 d f2f 3 d online	Spanish	20
6	ERU	February 27- March 3	Kayseri, Turkey	5df2f	Turkish	13
		_				
MARCH:						
n° Course	Partner	Date	Location	Course structure	Course language	Part. No.
7	TSNUK	March 6-7	Kiev, Ukraine	2 d f2f 3 d online	Ukrainian	21
8	UTARTU	March 9-10	Riga, Latvia	2 d f2f 3 d online	English	15
9	BREMEN UGS	March 13-15	Bremen, Germany	3 d f2f 2 d online	German	27
10	LITARTU	March 14-16	Tartu Estonia	2 d f2f 3 d online	Estonian	16
10		March 20-22	loannesburgh RSA	2 d f2f 2 d online	English	10
10	TONIUK	March 20 22	View Ukraine	2 d f2f 2 d online	Ukrainian	23
12	TSNUK	Warch 20-21	Kiev, Okraine	2 0 121 5 0 0mine	Ukrainian	10
APRIL:				6	c	
n° Course	Partner	Date	Location	Course structure	Course language	Part. No.
13	TSNUK	April 3-4	Kiev, Ukraine	2 d f2f 3 d online	Ukrainian	15
14	ERU	April 5-7	Kayseri, Turkey	3 d f2f 2 d online	Turkish	20
15	IST_SUPSI	April 10-11	Dübendorf, Switzerlanc	2 d f2f 3 d online	English	13
16	BREMEN UGS	April 21 - June 9	Bremen, Germany	4 d f2f	German	20
17	METCENAS	April 20 - 27	Prague, CR	2 d f2f 3 d online	Czech	58
18	IFI	April 21-22	Maribor Slovenia	2 d f2f 3 d online	Slovenian	16
10	9999	April 20-21	Pisa Italy	2 d f2f 3 d online	Italian	17
20	NTUA	April 24-28	Athens Greece	2 d f2f 3 d online	Crook	24
20	NIUA	April 24-26	Autons, Greece	2 d f2f 2 d ealine	Turkish	24
21	ERU	April 24-20	Alikara, Turkey	3 d 121 2 d online	TURKISH	17
BRANZ.						
IVIAT:				6	c 1	D . N
n° Course	Partner	Date	Location		Course language	Part. No.
22	ERU	May 2-4	Kayseri, Turkey	3 d f2f 2 d online	Turkish	21
23	IST_SUPSI	May 3-4	Cannobio, Switzerland	2 d f2f 3 d online	English	7
24	SSSA	May 8-9	Pisa, Italy 2 d f2f 3 d d		Italian	23
25	NTUA	May 8-12	Thessaloniki, Greece	2 d f2f 3 d online	Greek	23
26	INHGA	May 10-11	Bucharest, Romania	2 d f2f 3 d online	Romanian	19
27	IEI	May 11-12	Maribor Slovenia	2 d f2f 3 d online	Slovenian	12
28	IST_SUPSI	May 11-12	Yverdon-les-Bains	2 d	English	13
29	NTUA	May15-19	Creta, Greece	2 d f2f 3 d online	Greek	18
30	INHGA	May 16-17	Bucharest, Romania	2 d f2f 3 d online	Romanian	11
31	BREMEN UGS	May 16-23	Bremen, Germany	3 d f2f 2 d online	German	18
32	SSSA	May 19, 20, 21	Dresden, Germany	2,5 d f2f 2,5 d online	German	25
33	INHGA	May 23-24	Bucharest, Romania	2 d f2f 3 d online	Romanian	26
34	INHCA	May 29-30	Timisoara Romania	2 d f2f 3 d online	Romanian	21
34	INTOX					21
.IUNE:						
nº Courso	Dartnor	Date	Location	Course structure		Part No
n course	Paruler	lune 7 9 0	Roma Italy	2.5 d f2f 2.5 d online	Italian	04
35	SSSA	SSSA June 7, 8, 9 Roma, Italy 2,5 d f2f 2,5 d online		italian Class i	21	
36	IEI	June 15-16	June 15-16 Maribor Slovenia 2 d f2f 3 d online		Slovenian	13
37	SSSA	June 22-23 Lisbon, Portugal 3 d f2f 2 d online English		English	17	
38	SSSA	June 29,30	Munich, Germany	2 d f2f 3 d online	English	27
39	SSSA	Nov 28, 2016 - June 5, 2017	Remotely	Remote	English	107
		_				
JULY:						
n° Course	Partner	Date	Location	Course structure	Course language	Part. No.
40	SSSA	July 4,5	Napoli, Italy	2 d f2f 3 d online	Italian	31
41	SSSA	July 10-11	Milan, Italy	3 d f2f 3 d online	Italian	31
42	PARAGON	July 10 - Aug 2	Luga, Malta	5 d f2f	English	31
43	CSIC	July	Remotely	Remote	Spanish	6
44	8998	July	San Giov, Valdarno It	5 d full training	Italy	0
	000A	July	2 Sh Grott Pardamo, R	e e las denning	ndly	J
SEPTEMB	ER:					
nº Course	Dartnor	Date	location	Course structure	Course language	Part, No.
1 000130		Sentember 5 - 20	Luga Malta	5 d f2f	English	20
40	FARAGON	September 5-20		2 4 626 2 4 15	Catalan	28
40	CSIC Sep 27- Oct 2 Barcelona, Spain 2 d					

Table 1. Overview of the Local Courses performed in Task 3.3

3.2 Analysis of the courses

This section discusses and presents all the information gathered along the courses. Main findings are illustrated by means of tables and statistics.

Table 2 shows the number of attendees participating in the Local Courses per partner course. Moreover, the participants are separated by the type of institution they belong to.

To clarify each type of institution showed in Table 2; **geco** refers to geo-environmental company, **res** refers to research institutions, **gov/res** refers to government based on research centres, **gov** refers to government organisations or national authorities, **loc** refers to local authorities involved in water management, **rba** refers to river basin authorities, **wat** refers to water utilities, **epa** refers to environmental protection agencies and, finally **other**.

Partner	nº Participants	geco	res	gov/res	gov	loc	rba	wat	ера	other
SSSA	308	45	156		18	3	3	4	13	66
UNESCO	23		2		17	1		2		1
METCENAS	58		36		1	1				20
CSIC	18	5	1		12					
AMALTEA	69	6	11		2	24	13	2		11
IEI	41	6	24		6			3		2
ERU	71		29	10	31			1		
NTUA	65	3	61						1	
INGHA	77		13	4			60			
UTARTU	68	25	21		8		9	1		4
TSUNK	52	5	38						1	8
BREMEN BUSG	65	12	38		8	3		3	1	
PARAGON	70				70					
SUPSI	61	28	28			5				
TOTAL participants	1046	135	458	14	173	37	85	16	16	112

Table 2. Summary of the number of attendees (per type of institution) per partner involved in the courses.

As a result of all the local courses held, FREEWAT project has achieved 1.046 attendees in total. It is noticed that the target of participants in the Task 3.3 expected was 890.

This means a large number of individuals tested it, and their experience has provided the opportunity for improving the software. In fact, during the courses some bugs were detected and comments by the attendees were very useful to get new ideas for the platform development and coming courses. In addition, these attendees were spread out over the world, so the dissemination of the software by means of training activities has been successful with no doubt. If we consider the Groundwater Modelling Forum in LinkedIn has about 6500 participants, we can say that about 16% of this number was achieved during Task 3.3 activities. Further to this, the MODFLOW Users LinkedIn group has about 2700 followers, then we can say about 40% of the number of people interested in this family of codes have been reached. Information on courses were twitted by the H2020 Twitter account and reached often more than 1000 visualisations.

The following Figure 1 shows the percentage of involvement of each partner in this activity, based on the number of attendees at courses. While SSSA shows the largest percentage (29%), having also been undertaking courses on behalf of partner OSLANDIA, the rest of the project partners have similar percentages, being around 6%. Courses in Italy were particularly successful as they were recognised for Continuing Professional Development (CPD) by the Italian Chartered Engineers and Chartered Geologists bodies. Also synergies were run during the course in Rome with the H2020 KINDRA project.



Figure 1. Percentages of number of attendees involved in the local courses performed by each project partner.



The following Figure 2 presents the percentages of the type of institution involved in Task 3.3.

Figure 2. Percentage of the participants per type of Institution.

The most predominant type of institution involved in the courses is Research (res), 44% of the total. Other type of institutions demonstrated large interest in FREEWAT platform such as, private companies (geco) 13%, government organisations (gov) 17%, River Basin Authorities (rba) 8%, local authorities (loc) involved in water management 4%, water utilities (wat) 1%, environmental protect-agencies (epa) 1%, government organisations based on research centres (gov/res) 1%. A final 11% accounted for other type of institution (oth); this may include for example freelance professionals.

Students were involved in FREEWAT training with 11% of the participation (118 MSc students) in all the local courses. In Table 3 the number of MSc students involved in the local courses held by each partner project are shown.

Partner	MSc student
SSSA	38
UNESCO	
METCENAS	31
CSIC	
AMALTEA	
IEI	11
ERU	
NTUA	24
INGHA	4
UTARTU	2
TSUNK	5
PARAGON	
BREMEN BUSG	
SUPSI	3
TOTAL students	118

Table 3. Number of student attendees in the Local Courses performed in the Task 3.3

In order to understand the impact at world scale of the local courses, the following Table 4 shows the countries involved and the number of institutions for each country. The total number is 407, located in more than 50 countries, both European and non-European, spread out over the 5 continents. As such, FREEWAT has been disseminated not only in Europe but at global scale. The 407 Institutions, involved in the Local Courses, are detailed in the *Annex G Institutions Involved in Task 3.3.pdf*

Algeria1Angola1Australia6Australia1Bangladesh1Botswana4Brazil5Cameroon1Canada3Chile1Czech Republic13Democratic Republic of Congo1Estonia23Estonia23Ethiopia2France2Gerece11Italy67Jordan1Latvia11Lesotho1Malawi1Malawi1Malawi2Morocco1Morocco2N/A3Namibia2Nexterlands1Neitarads1Neitarads1Neitarads1Neitarads1Neitarads1South Krona1Sovenia3South Krona1South Krona1
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Slovenia 13 South Africa 3
South Africa 3
Couth Voron
South Korea I
Spain 46
Swaziland 1
Switzerland 40
Syria 3
10rkey 20
UN 2 Ukraina 31
7ambia 1
Zimbawe 2
TOTAL 407

Table 4. List of Institutions' Countries involved in the Local Training Courses.

In order to visualise all these countries involved in the courses, the following Figure 3 shows the percentage of participation of each country in terms of the number of institutions involved.



Figure 3. Percentage of Institutions per Country involved in the Local Courses, Task 3.3.

Italian, Swiss, German and Spanish Institutions have high involvement in the Task 3.3 with the percentages of 16%, 10%, 10%, 11% respectively.

A spatial distribution of all the countries involved is shown in Figure 4, as all the countries, which were involved in the Task 3.3, are painted in a world map. Additionally, Figure 5 presents the impact of the project during the activities run per continent.



Figure 4. World map of all the countries where the courses were held, Task 3.3



Figure 5. Percentage of the continents involved in the Local Training Courses, Task 3.3

Despite the expected impact in Europe (around the 80% of the participation), other countries not expected to be involved, had been interested by the training activities. These are the case of countries from America (i.e. Ecuador, Chile, U.S.A.), some countries of Africa (i.e. Algeria, Madagascar, Ethiopia), Asia (i.e. Bangladesh, Philippines, South Korean) and Oceania (Australia and New Zeeland).

3.3 Outcomes from participants

The outcomes about course were provided at the end of each course in the form of structured questionnaires.

Main suggestions and questionnaires comments from the local courses were compiled in each activity report by each course organisers/trainers.

The overall feedback on courses ranges from positive to very positive, accompanied by quite a number of remarks and suggestions.

The overwhelming majority of multiple choice questions in the questionnaires were answered with "Agree" and "Strongly Agree", hence a statistical analysis would not lead to any new piece of information and conclusion. The questionnaires contain also written comments or suggestions, some of them in the local languages. Some of the trainers translated and included these comments – when relevant – into the country reports.

Some of the comments were related to the FREEWAT software itself, requirements and difficulties with installation, lack of error management, lack of (theoretical) explanations in manuals and similar. Taking in account that the software & manuals were still in development and that many of course participants used their own computers, most of these remarks could be expected and difficult to avoid. Moreover, good knowledge of English, MODFLOW and QGIS was required but not always fully respected. Nevertheless, these remarks were reviewed while preparing course material for the coming courses (software/hardware system requirements) and the software version (i.e. error type, run errors in software).

The participants from various countries suggested longer face-to-face trainings, more exercises and examples in manuals/tutorials, additional explanation on input data, conceptual model and training for specific groups. Installation video tutorial could have been prepared and be distributed via YouTube and the User Group should keep good record of solved problems in the LinkedIn or other social media.

Questions were raised about connecting FREEWAT with other software (such as Hydrus or other models that deal with unsaturated zone, such as WOFOST, SWAT, etc.). It was suggested to organise combined trainings for a broader modelling suite. More attention to some specific modelling, e.g. seawater intrusion, was requested as well.

Several participants from universities expressed interest to include FREEWAT in their teaching curricula, either just as an example of a modelling platform or to implement it thoroughly along with exercises.

4 Additional training

Additional training was performed in order to fulfil the demand of attendees and to ensure the target expected. These courses did not comply with the full 5 days training requirements, being one or half day long. They were held basically face-to-face in three locations, Golden (USA), Gavorrano (Italy) and Vienna (Austria). The courses were conducted by TEA, TUDa, SSSA, IDAEA-CSIC, RT and IST-SUPSI. The additional training has reached 30 participants in total. Statistics about these courses given are provided in this chapter.

The Information related to additional training, such as partner in charge, location or their structure is described in the following Table 5.

ADDITION	AL TRAINING:					
nº Course	Partner	Date	Location	Course structure	Course language	Part. No.
45	SSSA	Apr-28	Vienna, Austria	half-day f2f	English	15
46	TEA & TUDA	May 20-21	Golden, Colorado, US	2-day f2f	English	10
47	TEA	June 14	Gavorrano, Italy	1-day f2f	Italian	5

Table 5. Overview of the Additional Training in Task 3.3

All the activity reports of these courses are detailed in the *Annex F Additional Training.pdf* file. In this annex is gathered all the information of the courses, from the activities reports to the list of participants. Therefore, Table 6 shows each course with the number of participants who have been attended, but also, the participants are separated by the type of the institution they belong to.

To clarify each type of institution showed in Table 6, **geco** refers to geo-environmental company, **res** refers to research, **gov/res** refers to government based on research centres, **gov** refers to government organisations or national authorities, **loc** refers to local authorities involved in water management, **rba** refers to river basin authorities, **wat** refers to water utilities, **epa** refers to environmental protection agencies and, finally **other**.

PARTNER	Location	nº Participants	geco	res	gov/res	gov	loc	rba	wat	ера	other
SSSA	Vienna	15		15							
TEA & TUDA	Golden	10	4	4			2				
TEA	Gavorrano	5	2	3							
TOTAL		30	6	22			2				

Table 6. Summary of the number of attendees (per type of institution) per partner involved in the courses.

Three type of institutions have participated in the additional training. Figure 6 shows the percentage of involvement of these types of institution in the additional training.



Figure 6. Percentage institution's type involved in the additional training.

The most predominant type of institution involved in the courses is Research (res) obtaining 73% of the total. Then, geoenvironmental companies (geco) were involved with 20% of the additional training attendance, and finally, local authorities (loc) involved in water management with 7% of participation. Detailed information about the Additional Training (i.e. Participation List, activity reports) is attached in *Annex F Additional Training, Task 3.3.pdf*

The following Table 7 shows the list of countries involved in the additional training, in terms of the countries where the institutions come from.

Countries	nº institutions involved
Austria	1
France	2
Germany	5
Italy	6
India	1
Ireland	1
Japan	1
Spain	1
UK	1
USA	9
TOTAL	28

Table 7. List of Institutions' Countries involved in the Additional Training.

The number of Institutions involved in additional training has been 28 in total, located in 10 countries, both European and non-European. The 28 Institutions, involved in the additional training, are detailed in the *Annex G Institutions Involved in Task 3.3.pdf*.

The percentage of participation of each country in terms of the number of institutions participated in the courses as additional training is showed in Figure 7.



Figure 7. Percentage of Institutions per Country involved in the Additional Training.

USA, Italian, German and French Institutions have high involvement in the additional training being 32%, 21%, 18% and 7% of the total respectively. Moreover, the rest of the countries have a similar percentage, being around 4% - 3% of involvement.

A spatial distribution of all the countries involved is shown in Figure 8.All the countries involved in the additional training, are painted in a world map.



Figure 8. World map which shows all the countries where the Additional Training were held or attendees were when they did the course remote

5 Deviation from Work Plan

The Task 3.3, **Local courses to build capacity at national level**, has been successfully undertaken thanks to the full commitment of all the partners: SSSA, UNESCO, METCENAS, AMALTEA, IEI, ERU, NTUA, NIHWM, UTARTU, TSNUK, PARAGON, BREMEN UGS, IST_SUPSI, IDAEA-CSIC and IGRAC.

Some deviations from the GA were anyway necessary. First of all, Task 3.3 should have been completed within Month 26. As Table 1 shows, most of the local courses started by April 2017. Given this situation, the Steering Group of the FREEWAT project decided to delay the submission of the report to the successful completion of the Task. This also happened because many courses were run with help of academic institutions and foreseen during the yearly academic courses period. This brought the problem of room availability, which was solved by postponing courses during the summer period.

Accordingly, to section 2 *"Methodology"*, some steps were decided by all the partners involved to allow the project task completion by all partners and the achievement of large impact.

A couple of partners did not reach to achieve the goal subscribed in the GA (the number of attendees principally). This is the case of IEI and UNESCO partners, which were not able to fulfil the required number of individuals trained. Their reasons and justifications are enclosed below:

IEI

"Slovenia is small country, with not so much people dealing with groundwater modelling. In the beginning of the project FREEWAT we could list the experts who were involved in groundwater modelling by us on the number of fingers. We hoped that we would make groundwater modelling more accessible with project FREEWAT, especially to the young experts and we think that we have succeed to some degree, especially with stronger connection with Slovenian Environmental Agency. We hoped as well to interest experts from Croatia, Serbia, Bosnia and Montenegro. But in the time of the project FREEWAT the Balkan countries faced with new financial problems and instability. The consequence was as well a reduction in funding for research and thus, during this time, they could not take the time for the workshop and some of them only satisfied with the access to the software and manuals on the project site.

Secondly, we noticed that there was a certain degree of restraint and mistrust in the beginning. In our environment, there are many workshops from various projects, which are more declarative and not so practical. That's why this restrain from beginning. After second course, sixth focus group and especially after the third course, a good voice and praise spread and interest has increased. But it was already an unfavourable time – start of the summer. Experts must to finish projects and prepare for the start of holidays in

our country. Some of the experts ask us if we will have another term for local course in autumn, but project is finish in September and so we cannot find one proper time for another course.

What we find important is that we have achieved that FREEWAT education will become part of a regular curriculum at the University Maribor, Faculty of Mechanical Engineering, Department for Energy, Process and Environmental Engineering – they are the strongest in Slovenia regarding environmental modelling. The local course, prepared by the FREEWAT project along with exercises and instructions, will become part of the course "Fundamentals of Environmental Modelling and Simulations". The holder of this course is the Associate Professor Dr. Jure Ravnik."

UNESCO

While UNESCO reached to organize a whole training in South Africa in March 2017 with participants from 13 African countries. Difficulties arose in gathering people from different African countries in just one location. – it was then not possible to repeat it.

Although these difficulties arose, the overall number of participants greatly overcome the expected one. Hence, we can say that these limited deviations did not affect the achievement foreseen for this Task.

6 Conclusions

The Task 3.3 Local courses to build capacity at national level, carried out in the framework of the FREEWAT project, has been successfully accomplished. The total number of attendees, including local courses and additional training, was 1.076. Individuals were trained during the period January – September 2017 in 49 courses and 53 countries.

Summarising the number of participants involved in WP3, a total of 1.176 participants were attended in all the training courses held during Task 3.2 and Task 3.3.

The outcomes of course participants about the FREEWAT modelling platform range from positive to very positive. The main comments were about software/hardware requirements, error handling, knowledge on MODFLOW and QGIS. The main suggestions regarded the need for longer face-to-face trainings, inclusion of more theoretical/background knowledge and real-world examples in the tutorials, to connect FREEWAT with other specific software (i.e. unsaturated zone). All these suggestions helped in improving last version of the software before the project end.

There is a clear interest in using FREEWAT in practice as well as to include it in the teaching material at university courses. Therefore, the maintenance and further development of FREEWAT should be strongly supported.

Document History

- V1.0. released 28/07/2017 release of first draft
- V2.0. released 04/08/2017 after WP3 leader review
- V3.0. released 07/08/2017 after task leader review
- V4.0. released 24/08/2017 after WP3 leader review
- v5.0 released 28/08/2017 after Coordinator's review

v6.0 released 04/10/2017 after PARAGON local course information and WP3 leader review

- v6.1 released 06/10/2017 after Coordinator's review
- v7.0 released 16/10/2017 after IDAEA-CSIC course and WP3 leader review
- v7.1 released 23/10/2017 after Coordinator's review
- v7.2 released 27/10/2017 after WP3 leader review

Annexes

The information provided in this report is complemented by the following annexes:

- Annex A Activity Reports from Local Courses, Task 3.3.pdf
- Annex B Participant Lists (signed) from Local Courses, Task 3.3.pdf
- Annex C Consent Forms (signed) about participation in FREEWAT.rar
- Annex D Confidentiality Agreement (signed).rar
- Annex E Questionnaires (feedbacks from the trainings) .pdf
- Annex F Additional Training, Task 3.3.pdf
- Annex G Institutions Involved in Task 3.3.pdf