ESF Science Meeting
"FLEXPART Training Course 4–6 June 2014"
Final Report

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Date of report: August 20, 2014

Summary

The second international training course for the Lagrangian particle dispersion model FLEXPART was held in Vienna, Austria. FLEXPART is a widely used, free transport modelling software. The course was organised by the Department of Meteorology and Geophysics at the University of Vienna, Austria, by Prof. Dr. Petra Seibert. The lecturer was Dr. Dèlia Arnold from Barcelona (Spain/Austria), assisted by Anne Philipp, M.Sc., from the Department of Meteorology and Geophysics at the University of Vienna. A total of 10 participants with different degrees of experience from 7 countries attended (see Figure 1), plus one student of University of Vienna not under ESF support. Unfortunately, a few participants had to cancel their participation on short notice. They were introduced to all aspects of using the model. The meeting was concluded by asking users for their feedback.

Scientific Content of and Discussion at the Event

The course consisted of a mixture of lectures and hands-on exercises.

The topics covered were as follows:

- Part 1: Theoretical background
    1. Dispersion modelling background
    2. What is FLEXPART
    3. Examples of applications
    4. Physics of FLEXPART
    5. Forward and backward runs
    6. FLEXPART output
- Part 2: Setting up FLEXPART
    1. Directory and file structure
    2. Input files
    3. FLEXPART WRF structure
- Part 3: Versions and FLEXPART evolution
    1. The beginnings
    2. From V6 to V9
    3. ECMWF and GFS versions
    4. FLEXPART WRF
    5. FLEXPART COSMO
    6. FLEXPART developers workshops
- Part 4: Compiling and running FLEXPART
    1. Libraries needed
    2. Compilation
    3. Makefiles
    4. Runtime problems

Handouts of the lecture slides were distributed to all the participants.

For the exercises, each participant had been given a user ID at one of the department's Linux workstations. Each pair of participants has an iMac workstation through which they could connect to the server (Figure 2). They had to solve exercises and were individually supported by the lecturer when necessary. After the course, all the files related to the exercises were made available for download.

Participants had lunch together each day in a nearby cafe, and were invited for dinner on Thursday evening to foster personal contacts.

Assessment of the results and impact of the event on the future direction of the field

The participants were very much satisfied with the course. A 1-page feedback form was distributed at the end. The questionnaire is annexed below, and the quantitative evaluation of the questions where participants were asked for a rating is given in Table 1.

The course has improved the understanding of Lagrangian atmospheric transport modelling among the participants. Those who were beginners with FLEXPART should have been enabled to practically work with the model, while more advanced users had the opportunity to deepen their theoretical understanding and practical knowledge of the various possibilities of the code. The usage of a high-quality model such as FLEXPART should thus become more widespread at the various institutions of the participants.

Among the verbal feedback provided in the evaluation forms, two are notable:

1. Increase the length of the course to a full week and provide more time to work through all the exercises.

2. Offer an advanced FLEXPART course.

As the TTORCH programme is coming to an end in 2014, it won't be possible to realise these suggestions under the same funding scheme. If suitable funding opportunities are found, we hopoe to be able to offer courses for FLEXPART users also in the future.

Table 1: Evaluation of the feedback form given to the course participants. The scale goes from 1 "perfect" to 5 "useless/inadequate".

Question	Score
Contents of the course	1.4
Format of the course, presentation style, guidance and materials received, etc.	1.3
Organisation before the course	1.1
Room, technical equipment, schedule	1.15
Presentation and guidance	1.0

Schedule for the FLEXPART Training Course 2014

Wednesday, 4 June 2014

08:45 – 09:00	Arrival of participants
09:00 – 09:30	Opening, introduction of participants
10:00 – 12:00	L1: Basics of FLEXPART and theoretical background
12:00 – 13:30	*Lunch*
13:30 – 14:30	L1: continuation
14:30 – 15:00	*Coffee Break*
15:00 – 16:30	L2: FLEXPART structure
16:30 – 16:45	*Coffee break*
16:45 – 18:00	L3: FLEXPART versions and input data

Thursday, 5 June 2014

09:00 – 10:00	Anne Philipp – Overview of ECMWF data extraction
10:00 – 11:00	L4: Hands-on:Installation and compilation of FLEXPART
11:00 – 11:15	*Coffee break*
11:15 – 12:30	L5: Hands-on: Forward runs, first introduction to post-processing
12:30 – 14:00	*Lunch*
14:00 – 15:00	L6: Visualisation of results
15:30 – 16:00	*Coffee break*
16:00 – 17:30	L7: Hands-on: Backward runs
18:30 – ...	*Social dinner (location will be announced)*

Friday, 6 June 2014

09:00 – 11:00	L8: Notes on post-processing of FLEXPART output
11:00 – 11:15	*Coffee break*
11:15 – 12:30	L9: Hands-on: FLEXPART-WRF
12:30 – 14:00	*Lunch*
14:00 – 15:00	L10: Hands-on: more complicated cases
15:00 – 16:30	Discussion, feedback, closure of the course

2nd INTERNATIONAL FLEXPART TRAINING COURSE
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Feedback form

Use also back side of sheet if needed

1. How did you hear about the course?

2. How experienced with FLEXPART have you been before:

nothing – beginner – intermediate – advanced

3. Contents covered in the course

Please indicate how much you are satisfied with the contents of the course, on a scale from 1 (perfect) to 5 (useless).

Which topics were most important for you?

Were there any topics not relevant for you? If so, which ones?

Did you miss any topics, and if so, what?

4. Format and presentation

Please indicate how much you are satisfied with the format of the course, presentation style, guidance and materials reeceived, etc., on a scale from 1 (perfect) to 5 (inadequate).

How was the organisation before the course?

How was the outer format (room, technical equipment, schedule)?

How was the presentation and guidance?

What were the “highlights”?

Do you have any suggestions for improvement?

Any other remarks

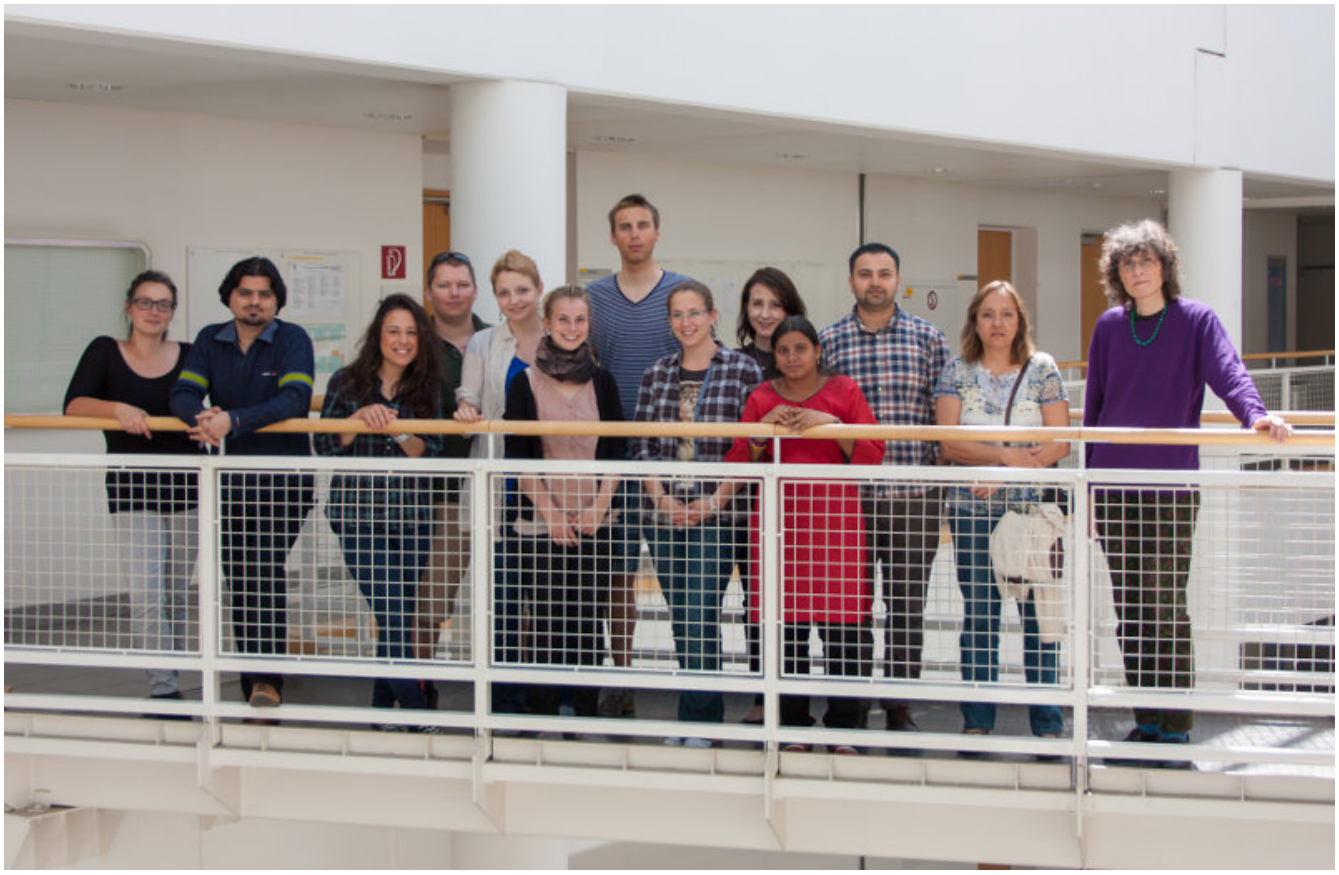

Figure 1: Participants of the course.

Figure 2: The course room with iMac workstations.