ESF Science Meeting
"FLEXPART Training Course 15-17 April 2013"
Final Report

Petra Seibert, Department of Meteorology and Geophysics, University of Vienna, Austria

Date of report: May 30, 2013

Summary

A 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 and taught by Dr. Dèlia Arnold from Barcelona (Spain). A total of 24 participants with different degrees of experience from 14 countries attended (see Figure 1). They were introduced to all aspects of using the model. The meeting was concluded by an outlook on the coming developments in FLEXPART and asking users for their feedback, both on the model development and on the course.

Figure 1: Participants of the course (a few already had left at this moment).

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, as well as the TTORCH brochure and the TTORCH summer school announcement.

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.

Figure 2: The course room with iMac workstations.

Participants had lunch together in the University Cafeteria on Monday and Tuesday, and were invited for dinner on Tuesday evening to foster personal contacts.

At the end, Petra Seibert introduced the planned developments for FLEXPART as discussed in the the developer workshops of 2012 and 2013, and asked the participants about their feedback on priorities for FLEXPART development. Two points were raised, making the output available also in netCDF format (this is already on the list) and making available scripts for trivial parallelisation (maybe this could be a Bachelor thesis in IT?).

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.

As they have been introduced to the developers' group and its planned way of interaction with the users through the new `http://flexpart.eu` web site, we hope that this communication will take place and develop well.

The lecture materials will be integrated in the new FLEXPART web site `http://flexpart.eu`.

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

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

FLEXPART Training Course
15-17 April 2013

Schedule

Mon, 15 April 2013

8:30 – 9:00	Registration
9:00 – 9:15	Opening
9:15 – 10:30	L1: Basics of FLEXPART and theoretical background
10:30 – 11:00	*Break*
11:00 – 13:00	L1 continuation
13:00 – 14:00	*Lunch*
14:00 – 15:30	L2: FLEXPART structure
15:30 – 16:00	*Break*
16:00 – 17:30	L3: FLEXPART versions and input data

Tue, 16 April 2013

9:00 – 10:30	L4: Installation and compilation of FLEXPART
10:30 – 11:00	*Break*
11:00 – 13:00	L5a: Hands-on forward runs and introduction to post-processing
13:00 – 14:00	*Lunch*
14:00 – 15:30	L5b: Hands-on forward runs with complex sources
15:30 – 16:00	*Break*
16:00 – 17:30	L5c: Hands-on backward runs and post-processing
18:30 – ...	*Social dinner (location will be announced)*

Wed, 17 April 2013

9:00 – 10:30	L6: Visualisation and post-processing of FLEXPART output
10:30 – 11:00	*Break*
11:00 – 13:00	Discussion with participants and closing

Location:
Dept. of Meteorology and Geophysics, Univ. of Vienna, Althanstr. 14, 1190 Vienna, Austria
Building UZA2 (UZA Haus 2), Room 2F513 (between staircase F and G, 5th floor).