

Evaluation results: Core course 'Atmosphere & Ocean' (Feb 29 - March 21, 2016)

Course details

IMPRS-gBGC core courses introduce doctoral researchers to scientific fields relevant to global biogeochemical cycles in which they have no deep knowledge yet. The purpose of those courses is to facilitate interdisciplinary communication and collaboration.

8 doctoral researchers and 7 instructors were involved. More information is available on the course website: <http://www.imprs-gbgc.de/index.php/Courses/AtmOcean2016>

Survey results

6 (out of 8) course participants have filled in the online survey.

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Part 1 - February 29 & March 7

Feedback on the general assessment

How useful was the course in providing background knowledge on the Earth system compartments atmosphere and ocean, especially with regard to biogeochemical cycling? (Answer: 1=not useful at all...5=extremely useful)

4.4

How useful was the course for your individual research projects? (Answer: 1=not useful at all...5=extremely useful)

3.2

Please remark on the overall structure of the course.

- Appropriate.
- I think, it is good that the course is split up on several weeks. Also the combination of lecture and practice is quite good. To my surprise, there was very few information on oceans.
- Each module is focusing on a specific aspect well.
- very good structure - I think it is good that the course is split up over weeks
- The structure is nice. Combining the theory and exercise is critical for us to understand the mechanism

Basics - Axel Kleidon

Please comment on the first module on Feb 29, e.g. regarding the context of the module, level of detail, contribution of the lecturer and the participants.

- My favorite part, very interesting approaches and helpful for understanding the Earth System
- The combination of lecture and calculation tasks between the lecture parts was good because it involved the participants and lead to a better understanding of the equations. The context was quite interesting although I think I do not need it for my individual project.
- It was well structured with physical aspects, exercises and a little connection to biogeochemical cycles at the end.
- very good introduction - I really liked the small exercises during the lecture
- The lecturer is so considerate, he prepared everyone a handout of slides which useful for students to take notes and familiarize the lecture content

Radiation - Dietrich Feist & Julia Marshall

Please comment on the second module which took place on March 7.

- Dietrich's part was somewhat dry, it was probably too theoretical and not "anschaulich" enough for non-physicists. - Julia's presentation was fun with all the examples of interesting optical phenomena. Perhaps this should be presented as a teaser before the theory hits the audience.
- Because the lecture part was quite long and without breaks, it was harder to stay concentrated than during the first module. The information given was still quite interesting. Although there was some trouble with the software during the practical part, Julia Marshall managed very well to let everybody participate in it and made clear what it was about.

- Generally the course materials were really good and useful. But there were some parts that were lengthy.
- I appreciated that Dietrich explained every graph in detail (often in other presentations scientists run quickly through all slides) - the 1D model Julia presented us was very helpful understanding the processes explained before
- They are very nice, they have different teaching style. Dietrich teach the theory slow but no much time for exercise, while the Julias is just opposite. It is better if Dietrich can have more time for exercise while Julia can teach the theory a little slower

Summarized feedback

Which parts were especially good (and why)?

- Axel's examples of relative magnitudes of effects get one thinking about dynamics and energy in the Earth System in a new way, I felt more able to grasp what is going on in the atmosphere after that - Axel's strategy to throw in short exercise-calculations every once in a while was great.
- The combination of lecture and practice in the first module (small calculations every few slides) was very good.
- Exercises that helped us understanding the principles.
- The basic and the development of theory

Which parts were not so good / not so fitting / not well enough presented?

- See comments on Dietrich's and Julia's presentations
- Because many participants had some trouble with the software, they could not do all of the tasks or it was quite hard to follow.
- Probably none
- could be some more modelling tasks inbetween (2nd part of the course)
- The part presented by Julia but her exercises are quite good

Please suggest components that a future class on atmosphere and ocean at the IMPRS-gBGC should include in addition to OR instead of what has been discussed this time.

- As usual, there were problems with getting the exercises running (ssh and x11). This is a pain in almost every course, and should really be improved.
- Axel once asked us if focusing on anthropogenic impacts would interest us. Some instructors also in the overview course briefly talked about them but coarsely. It will be very interesting to see human impacts on biogeochemical cycles and physical factors.

Part 2 - March 14-15 & March 21

Feedback on the general assessment

How useful was the course in providing background knowledge on the Earth system compartments atmosphere and ocean, especially with regard to biogeochemical cycling? (Answer: 1=not useful at all...5=extremely useful)

4.0

How useful was the course for your individual research projects? (Answer: 1=not useful at all...5=extremely useful)

3.0

Please remark on the overall structure of the course.

- 1. Mainly because not many people at the institute are researching on ocean, ocean part was touched only slightly. However, ocean plays pivotal roles in global atmospheric cycle, this can be taught more in detail. 2. It is difficult to provide well structured lectures that cover important aspects of atmosphere and ocean within 5 days by several instructors. The connections among lectures provided by different people can be improved although each lecture was generally composed well.
- Well, I don't like the block-structure (lecture-exercise) so much. I think when you start the exercise, you already forgot half of the presentation. Some exercises should be guided.
- Having one day of course in a week was quite nice. Also the combination of lecture and practice was good. Maybe there could have been less information on Eddy-covariance and more on other topics.
- The overall structure of the course is quite good--basics of different topics and ancillary exercises
- a little bit too much overlapped with the basic introductory course
- I liked that it was split to several weeks.

Dynamics & Surface exchange - Christoph Gerbig

Please comment on the modules presented by Christoph Gerbig on March 14-15.

- It was good.
- Overall good - The part on turbulence might have been too much if you haven't heard about it before. For an introduction, it's probably enough to talk about either similarity theory or K-theory, not both
- The lecture was quite good and understandable. He also explained the background of the practical part a bit.
- Christoph gave us some details about hydrology and land surface climatology, it is useful in future
- nice and informative
- I can't remember details. I think it was ok

Dynamics (Numerical transport modelling) - Christian Rödenbeck

Please comment on the lecture and practical by Christian Rödenbeck on March 14.

- It was good.
- No suggestion for improvement of the lecture - Good idea to include the 2003 heat wave
- Exercise was pretty good and sparked interest to play around
- The lecture was also quite good but in the practical part there were some software problems. Therefore not everyone could do the task because the description was too quick to try some steps again.
- It's good and the practise impress me with atmospheric transport
- nice and informative
- the practical part was not so well organised, as Christian assumed that everybody knows shell-commands, which was definitely not the case

Eddy flux measurements - Olaf Kolle

Please comment on the module which was presented by Olaf Kolle on March 15.

- Eddy covariance is one of the important techniques in atmospheric science, but this part contained too much detail in this atmosphere and ocean course. Maybe providing principles and theory with a little bit of practical part could have been enough, but introducing different types of analyzers and data processing can be provided in eddy covariance workshop.
- Most parts of the lectures didn't seem to fit into the topic of the course: Olaf presented differences of many Eddy-Covariance measurement instruments, but that's only relevant for someone who is about to start a project using the technique. The same applies to the detailed description of the data processing.
- The practical presentation of some eddy flux measurement systems was interesting. For those, who do not work on eddy flux measurements the lecture in the afternoon on the processing of the data was maybe too detailed and not very useful.
- It's quite useful but I think it is better if we have some relevant data to play at data processing part.
- too much detail, too little general understanding of how eddy covariance works
- Too much about available anemometer and gas analyser types.

Climate, Feedbacks and Change - Axel Kleidon & Martin Heimann

Please comment on the last module which was offered on March 21.

- It was generally good.
- ### Martin ### - Martin was too fast, his lectures sometimes felt like a teaser for a longer series of lectures - He often briefly presented slides and referred to the introduction course for a bit more detail. That's good for refreshing the topics for someone who had the introductory course, but not for those who didn't - It was a good strategy to throw in questions about data examples to illustrate the large scale processes - He should reserve more time on the nice models he built in Mathematica. Of course one can play with them later, but no-one does that after already spending a lot of time in class. ### Axel ### - Axel presented some of his own work, some of which isn't basic knowledge for this core course. Personally, I liked the topics nonetheless.
- The lectures were both interesting although Martin Heimann went through his slides very quickly.
- Martin gave more talks about ocean which didn't reach by other teachers. Axel are quite considerate and print everyone handout, I think it's useful for students to make some notes.
- the ocean part was only a repetition of the introductory course
- very nice!

Summarized feedback

Which parts of the course were especially good (and why)?

- The exercises on TM3 and STILT were very hands-on, it's probably the best you can do with these models given the time. They first planned to let everyone decide whether he wants to work on either TM3 or STILT, but I think it's good to do it together.
- Axel Kleidon gave out copys of his presentation so that one could write down notes on it which was quite useful. Also the part on ocean cycling was interesting because the rest of the course focused more on atmosphere.
- I quite like the last day course presented by Axel Kleidon who interact the his research with some social science which quite interesting and enlightened.
- the part about atmosphere was good and informative
- the last day was very good. Not too detailed, but informativ anyway

Which parts of the course were not so good / not so fitting / not well enough presented?

- As mentioned above, Martin should improve the structure of his lectures Getting the exercises of Christoph and Christian to run worked better than in the first days of the course, because we spent 30 minutes to get them to run before beginning the exercises. However, this is not enough: people who never work with terminals (more than half of the class) lack basic knowledge necessary for this kind of exercises and often drop out when they encounter the first problem the lecturer didn't account for (on the level of typing "ssh your_username@hostname" literally instead of replacing "your_username" with "freum"). They need to prepare before the course to be able to use basic commands (ssh, pwd, cd, cp, less, more, <, >, local executables). They also need step-by-step instructions they can follow.

- As was already discussed with the lecturers (especially Axel Kleidon at the last day), there were some software problems. Therefore one was sometimes more busy to solve them than in thinking about the actual problem and the use of the software. Maybe this could be solved by providing more information on the software in advance. The part on processing of eddy flux measurement data was maybe too broad and should maybe better be integrated in the course on eddy flux measurements.
- The basic related Eddy covariance like footprint and some exercises in atmospheric transport or radiation model (we were not informed with some special software installing)
- see 6 and 7. a much more basic introduction to eddy covariance should be included and details for measurement instruments and assessing data quality can be omitted from the course. Some people had problems setting up an ssh connection with x server, maybe on the first day there should be 15min of systems check so the participants can change/ fix things if necessary.
- a usual issue when the students are asked to run some scripts, is that they dont have the right software installed. it takes a very long time to get it run for everybody. one option would be, to send detailed instructions on how to install which software to the participant a week before the course starts, with the possibility for the students to contact the teachers if it doesn't work.

Please suggest components that a future class on atmosphere and ocean at the IMPRS-gBGC should include in addition to OR instead of what has been discussed this time.

- As already discussed, a broader part on oceans would have been interesting.
- more on ocean, maybe someone from outside the institute.