Evaluation results: Earth Observation Techniques course
(September 3-7, 2018)

Course details

IMPRS-gBGC skill courses introduce doctoral candidates to scientific techniques relevant to global biogeochemical cycles. More information is available on the course website: http://www.imprs-gbgc.de/index.php/Courses/EarthObservation2018

Survey results

11 out of 19 course participants have filled in the online survey by September 26.

The goals and the structure of the course matched well with the course description.

strongly agree	6	55%
agree	4	36%
neither agree nor disagree	1	9%
disagree	0	0%
strongly disagree	0	0%

Comments:
- There was no course description, only an outline
- Well organised

Please comment on the parts presented by Christiane Schmullius, Sören Hese and Carsten Pathe on Mon and Tue, Sep 3-4.
e.g. regarding the context of the module, level of detail, contribution of the lecturer and the participants.
- The coarse presented by Prof. Schmullius was very interesting. Learning more about the theory behind the tools was very useful.
- The instructors provided a good introduction to the field of remote sensing. I particularly enjoyed the presentation on radar remote sensing, and appreciated the detail given on specific applications of this technique.
- Lectures by Prof. Schmullius were a fantastic introduction. Exercises were a little too short on day 1.
- very nice overview, good examples, vivid and enthusiastic lecture
- Very good introduction into remote sensing and radar. Christiane made us think about differences between different data types and their implications which was very enlightening. The only thing I was lacking a bit at the end was a clear overview of the individual satellites and their different measurements/products, but admittedly we covered a good deal and this probably originates from the sheer number of satellites Christiane had to cover. Sören covered interesting knowledge of data storage and accessibility. Unfortunately he repeated half of Christiane's lecture and then was short on time for the new content he was presenting (data processing) so he had to rush through the second part of the lecture - this compromised the understanding and could be better coordinated next time! Both exercises

were useful to understand satellite data processing but not directly relevant to most participants that I talked to, so it was good that they were kept as brief as they were.
- Christiane Schmullius's presentation was very organised, enough detailed, and well presented. I learnt a lot from her. Sören Hese and Carsten Pathe were also fine. but I exploited Christiane's session more.
- contribution of all lecturers was punctual and important. - there was not enough time in general for the lecturers to get in to details. - the quality of the presentations was high in general. A better organization and the development of a presentation for the practical session of Dr. Hese would be helpful since many students were lost during the practical exercises.
- I liked the parts from Christiane Schmullius. It was very structured and comprehensive. Both the practicals were good I guess when you would really work with these programs, for me they were rather useless.
- theoretical parts were interesting and covered a wide field on satellite principles, including radars, particularly for which given by Christiane. Some gaps could have been well filled in the practical side, i.e. giving basic idea about image processing instead of following advanced software to process images.
- very informative, but the practical part is quite short.

Please comment on the parts presented by Julia Marshall on Wed, Sep 5.
- The lectures was comprehensive.
- Dr. Marshall did a good job describing the steps involved in preparing a satellite mission and the technical details of atmospheric observation from space
- Very good module. The group exercise "Designing a satellite" was absolutely fantastic.
- Very clear and enthusiastic introduction to remote sensing and atmospheric sensors by Julia. She covered some basics that would have been more useful/logical in the beginning of the course (details on instruments, satellite orbits and viewing geometry which Christiane took for granted / did not cover explicitly).. but was ok (and good to be covered!) at this point also. Julia presented a very nice overview over all relevant satellites. The exercise of "design your own satellite mission" was a bit too open for my taste (good to think about the practicalities, instruments, geometries etc., but it took a lot of time for the outcome. I would have preferred one or two concrete example missions to discuss.)
- All the parts were presented very good!
- the presentation skills and the enthusiasm of Dr Marshall were great and made the lecturers interesting even for people from other scientific fields. - the material was great - the final exercise (develop your own satellite mission) was the most interesting and engaging exercise that I have ever encounter in the IMPRS seminars
- She's a very good lecturer. Developing your own satellite was also a lot of fun.
- Julia did a great job at keeping a very dynamic environment. Content was spot on, and, well it was fun!
- Modules were connected and successive as well as having a clear material. Most important information of passive and active satellites were given, and mostly explained all required themes relevant to such sections. The lecturer was objective at elucidating all sections.
- very informative

Please comment on the parts presented by Javier Pacheco on Thu, Sep 6.
- The Javier's lecture material was good. But lecture was so fast and for someone not so familiar with the topic was difficult to follow.
- Javier's presentation was interesting but the material was presented a bit fast. The material was too detailed for me as someone unfamiliar with the specific field: I had to look up some

of the original papers referenced in the presentation in order to contextualize and actually grasp the material presented.
- nice overview, open for questions, right amount of detail
- Javier and Xuanlong both gave a good introduction into the fundamentals of the covered fields which I could follow and understand their relevance. Javier later went into a lot of detail which was hard to grasp so quickly - maybe next time try to summarize the most important knowledge into an overview instead of going through 10 papers individually for the purpose of an introductory lecture.. or discuss a couple of studies in more detail. The rate of information input was a bit intense.
- well structured presentations/lecturers
- In general it was good, it was only a bit too dense on information. That's also whey he came an hour short.
- Maybe too much detail into the inners of fluorescence, time schedule did slip a bit too. Other than that everything was good.
- the context was related to the target of the modules and interesting for those who are involved in vegetation retrievals. Materials also were clear and worthy of information, but more spaciest, which means more viable for whom working in the same field.
- very informative, but there is very short practical part

Please comment on the parts presented by by Martin Kunz on Fri, Sep 7.
- Everything was good.
- Martin's presentation was very informative, interactive, and the material was clearly presented.
- Very good block, with lots of practical information.
- All the parts were presented very good!
- well structured presentations - would be interesting if the image processing example run by Dr Kurz could be broaden to a practical exercise for the participants
- He was to the point, very dynamic and solved every question
- I consider it as a perfect part from according to feedback of which I have got. In fact, he systematically deciphered many secrets over drones and unmanned aircraft systems used remote sensing, typically radar range. His empirical section was clearly understood supported by detailed explanation.
- very informative and it is good to understand

Please comment on the parts presented by Markus Guderle on Fri, Sep 7.
- Very nice lecture.
- Markus did a good job in demonstrating the specific applications of terrestrial lidar.
- Dr Guderle focused mostly on the applied part of EOT, which was interesting - the material was okay
- This section was also well organised and delivered the goal beyond it, focusing on fire detection in the vegetation fields using Lidar systems. Clear materials and packed in demanded data. Lecturer was clear and logical as well.
- The Lidar results is very impressive and interesting

Please comment on the contribution of the participants.
- Unfortunately many of the participants were absent during the course sections at MPI. By Friday there were only a handful of students in attendance.
- Nothing out of the ordinary - as usual, some quiet individuals mixed with some more outspoken. Ok.
- on the days I participated, most participants contributed well to the course

- Most participants actively contributed to questions, discussions and exercises.
- promising!
- less than expected students appeared to the lecturers
- Practicals every day was good.
- participants contribution were varied based on the prior background for each. Their questions and comments during the events were important to clarify some ambiguous topic.
- It is very good that people are raising a lot interesting questions and interacting with each other

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

- The first part. The topic was new form me.
- In my opinion, Christiane Schmullius's session was the best because of the way of conveying the concepts as well as coherent topics.
- Prof. Schmullius introductory course - very good general overview. Exercise on satellite design (J. Marshall) - for me a model way to engage the participants, force them to think and learn in the process during a limited time.
- Dr Schmulius's radar lecturers were very interesting. There should more time to deepen in it.
- The presentations on radar remote sensing, atmospheric composition and planning satellite missions, and the section on UAVs. These modules were more clearly presented than some of the others, and with less redundancy.
- Overall the course gave a good overview, general physical understanding of remote sensing and appropriate level of detail. Day 1-3 were most relevant to me since they covered a lot of useful fundamentals on satellite function and data.
- I liked the presentation on radar by Christiane Schmullius. It was both really good and in my direct personal interest for my research.
- Christiane, Julia, and Martin's sections were more interesting to me, probably because they relate to my field more than other field do. In addition, presenters have very good skills in delivering information.
- lecture taught by prof. Schullius, practical session taught by Xuanlong

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

- 5x no one or (-)
- All the parts I attended were good enough.
- Other than good course mentioned above can be considered as less appropriate to me, but very good for other participants that are interested in depending on their fields. Therefore, all was interesting and fitting.
- In general, there was a lot of overlap in the material presented. I asked some of the presenters if they had been given a preview or information about what their colleagues had presented previously, and they said they had not. I think better communication among the presenters would reduce the redundancy of the information presented and improve the course.
- The exercises were not directly relevant for me (as in using the software again later) - but good to get a more practical understanding of the data. They should not take up more time than they do now.
- The lecture Introduction to Image Processing was somewhat fast, making it difficult to follow. It was very fitting to the rest of the schedule though.
- I probably disliked the part from Soeren the most. It was difficult to pay attention, because he presents in a monotone voice.

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.

- For me the remote sensing part (day 1-3 on satellite data) and vegetation products (Xuanlong) were most relevant. An overview over satellites, their products for each sphere and comparison/differences between them could be useful (were partially presented e. g. by Julia, partially by Christiane due to content volume). For someone mainly working with satellite products instead of raw data this would have been preferred over proximal sensing techniques, but of course this is individual preference and might also not fit into the scope / time frame of the course. Thanks for organising!
- A practical on working with a finished remote sensing product instead of working with the raw data output with gray values. Come up with a goal (calculating monthly anomalies from daily data for example) and come up with a good filtering method for good/bad data. Take into account acquisition time for example etc.
- If possible, software that are required in practical courses can be installed in the participants' laptops to use it with organised exercises that can be conducted at home better than rolling all important tasks within a few minutes in a lab. In theoretical side, retrieval algorithms would have been present in more details instead some sections that are very advance through all the modules.
- techniques e.g. eddy covariance