



Research Networking Programmes

Short Visit Grant or Exchange Visit Grant

(please tick the relevant box)

Scientific Report

The scientific report (WORD or PDF file – maximum of eight A4 pages) should be submitted online within one month of the event. It will be published on the ESF website.

Proposal Title: Nutrients matter most for global forest carbon balance

Application Reference N°: 6805

1) Purpose of the visit

I used this short-visit grant (finally from 22/09/2014 to 26/09/2014 – 5 days) for two main purposes: first, to attend to the 1st ICOS Science Conference on Greenhouse Gases and Biogeochemical Cycles, in Brussels, to present my latest published work entitled “Nutrient availability as a key regulator for forest carbon balance”; second, to meet with Dr. Sara Vicca and Prof. Ivan Janssens from the University of Antwerp, both co-directors of my PhD thesis, to discuss the state of our projects and how to proceed from now on.

2) Description of the work carried out during the visit

During the visit, I made a presentation entitled “Nutrients matter most for global forest carbon balance” which took place on Wednesday 24 of September at 16.10h at the Auditorium Albert II (Academy Palace, Brussels). In that presentation, I explained our latest published paper in Nature Climate Change: “Nutrient availability as a key regulator for forest carbon balance”.

Attending to this conference, also gave me the opportunity to meet new people involved in similar scientific subjects as I am, to establish possible future collaboration and to share experience and knowledge.

With my supervisors, we also discussed about the work we are doing now. We are trying to find evidences of the fertilization effect of increasing CO₂ on forest productivity. Up to now, we were using data derived from eddy covariance towers. After seeing some insightful presentations in the ICOS science conference, we decided to try using other

databases such as the global NBP (MACC v.13) and remotely sensed vegetation indices to also test our hypothesis.

Finally, we thought about a third work exploring the average carbon allocation to reproduction in European forests using data from the ICP Forests database. However, most of the discussion was about the previous work.

3) Description of the main results obtained

During the presentation, I explained that nutrient-rich forests are capable to sequester more carbon than nutrient-poor forests for the same average gross primary production (GPP). This leads to mean carbon use efficiency at the ecosystem level (CUE_e) five times higher in nutrient-rich than in nutrient-poor forests. Also, across nutrient-rich forests, increasing GPP is translated into increasing NEP; conversely, increasing GPP in nutrient-poor forests is translated into higher ecosystem respiration (Re). These results were found to be robust since when testing them among forests of all ages (<15, <50 and >50 years old) remained unchanged. Also controlling for possible influencing factors such as climate, our analyses confirmed the main importance of nutrient availability.

4) Future collaboration with host institution (if applicable)

We plan to continue collaborating since we have, at least, two more projects currently going on. The first work is the one trying to find evidences of the CO₂ fertilization effect on forest ecosystems and the second one is to evaluate the percentage of photosynthesis allocated into reproduction by the European forests. Therefore, will be collaborating during one and a half or two years more, at least. After finishing my PhD, it is likely that we still collaborate in future research.

5) Projected publications / articles resulting or to result from the grant (ESF must be acknowledged in publications resulting from the grantee's work in relation with the grant)

Reference:

Fernández-Martínez, M., Vicca, S., Janssens, I.A., Sardans, J., Luysaert, S., Campioli, M., Chapin III, F.S., Ciais, P., Malhi, Y., Obersteiner, M., Papale, D., Piao, S.L., Reichstein, M., Rodà, F. & Peñuelas, J. (2014) Nutrients matter most for global forest carbon balance. 1st ICOS Science Conference on Greenhouse Gases and Biogeochemical Cycles 2014, 22-26 September 2014, Brussels.

6) Other comments (if any)

Thanks a lot for giving me the opportunity to attend to this conference, from which I could meet