GRACEFUL (**GR**avimetry, m**A**gnetism, rotation and **C**or**E** **FL**ow)
Synergy Grant (Number 855677) from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme.

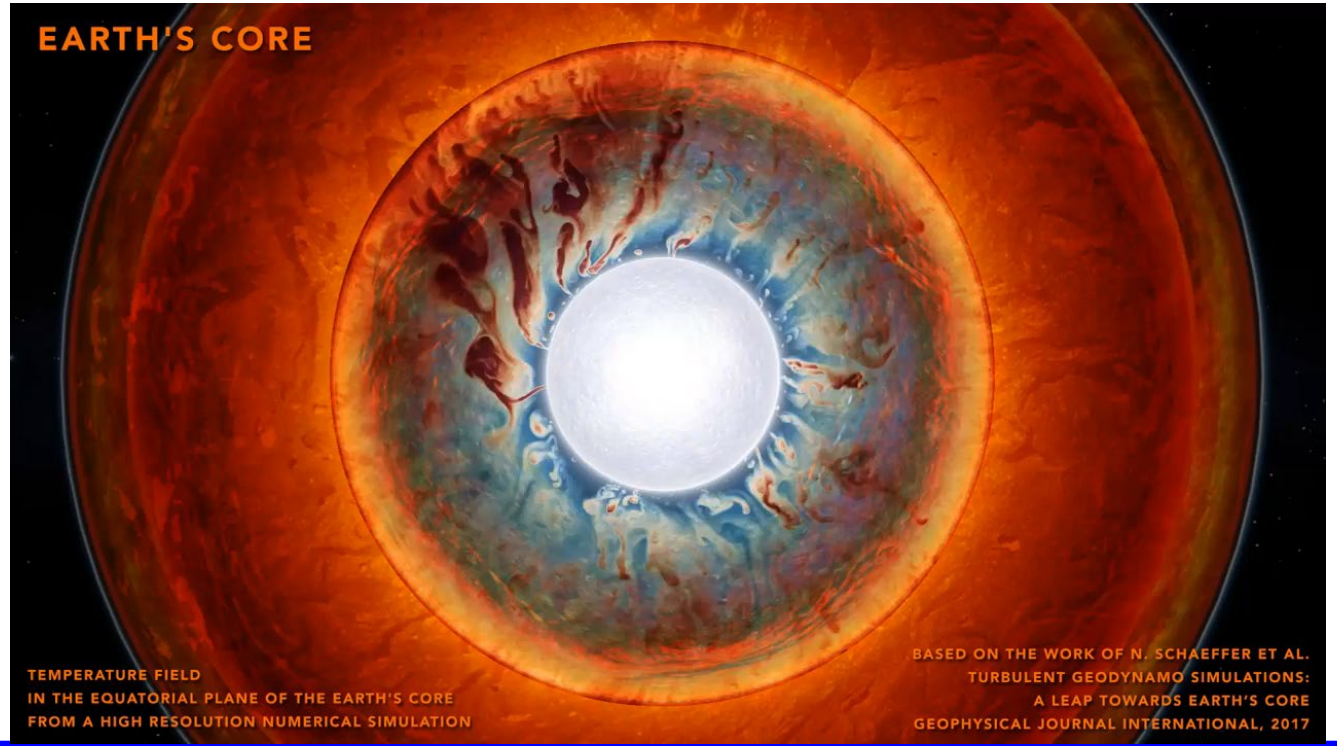
What advice to give?

Veronique Dehant

WHY?

To significantly improve our understanding of physical processes involved in the deep interior of the Earth. *In particular, we shall study*

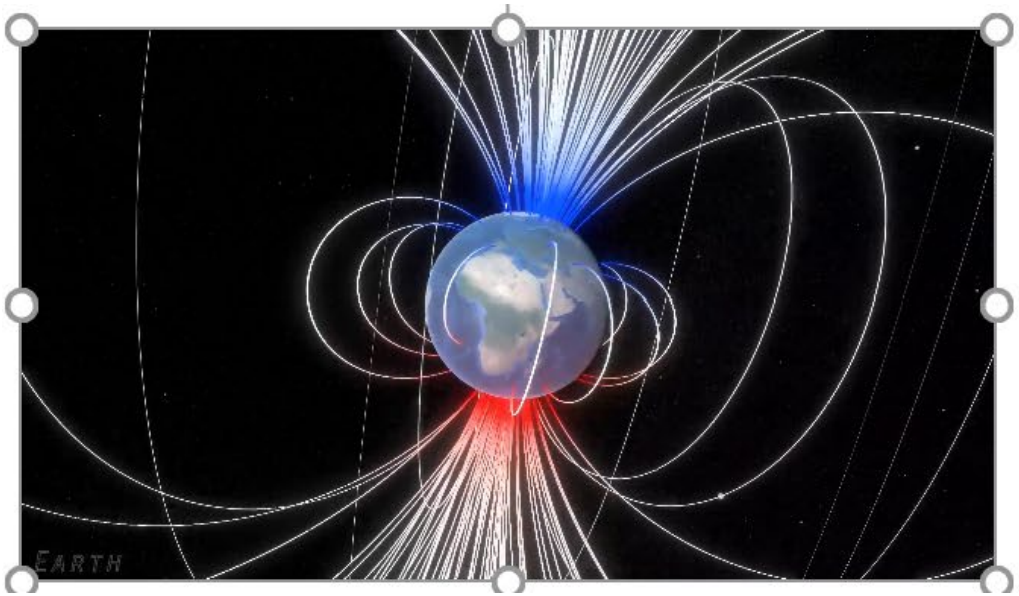
- the dynamics of the Earth's fluid iron-rich outer core and its impact on the Core Mantle Boundary (CMB)
- the interaction between the core and the mantle
- the geomagnetic jerks related to rapid flows in the core
- the impact of the core flow on the rotational properties of the Earth and on the gravity field



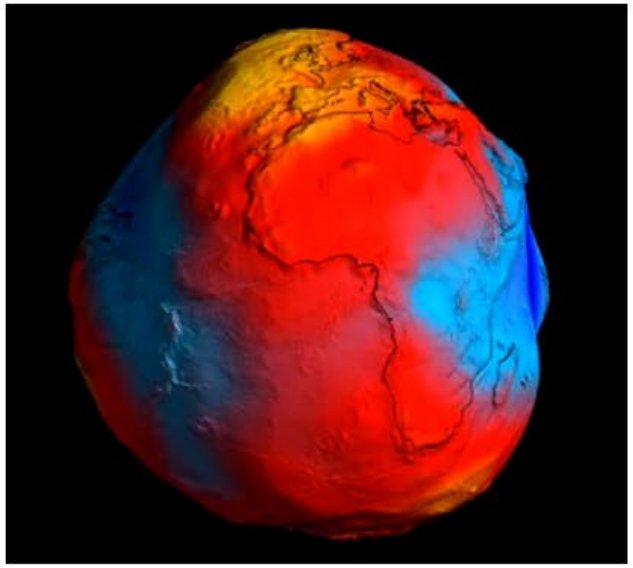
(After Schaeffer et al., 2017)

HOW?

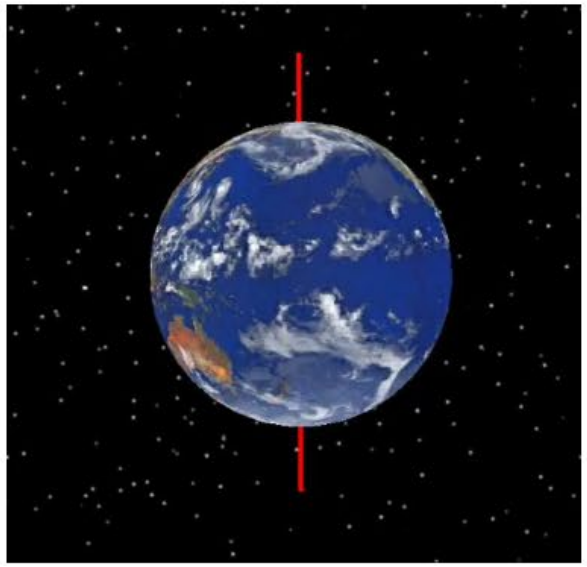
Using in synergy observations of the Earth magnetic and gravity fields and of the Earth's rotation (Length of Day/LOD)



Magnetic field



Gravity field



Rotation of the Earth

Did you decide to collaborate outside your team on a certain research topic ?

- Yes I decided. But I was maturing the idea speaking with my collaborator fellows.
- The important start is to have an innovative idea to advance your own research.
  - I wanted to further know on the liquid outer core of the Earth not only from my own field but from other fields. I was convinced that jointly use of other fields data/results/models would advance the field in a break-through way.
- Then you need to identify the other fields that will advance yours.
  - I was getting information about the Earth core from Earth rotation but people studying the magnetic field and people studying the gravity field of the Earth also get information on the deep Earth interior.
- Then you need to convince the other-field fellows that they will gain too in their own field.
  - I contacted people from other field and got their enthusiasm for the project.
  - This is the way it started.
- Sometimes it started from discussing with friends. But do not generalize this: it is not a good idea to start from a group of friends who want to work together. It is better to start from the idea and look at the needs to mature the idea; and take the best in the domains needed.
  - For me it happens to be good friends!

How long did the preparation of the proposal take and the writing process?

- We started maturing the idea with joined discussions.
- We then assembled literature on our own domain and shared that with the other collaborator, indicating the important parts, summarizing already the important part for the others.
- We then decided together on a structure to reach our objectives (we defined WPs).
- We then shared the work on writing each of us.
- We then cross-read the texts, discussed formulations, shared questions.
- We then verified the way the proposal was evaluated to be sure that we were answering all the points that were evaluated.
- We also verified that the wording was understandable by people outside of the field in particular for the part B1.
- We also verified that some typical wording of ERC evaluation were in the proposal, such as risky, out-of-the-box, innovative, frontier research, synergy, excellence, efficiency, effectiveness, highly interdisciplinary research, going well beyond, nurturing the future, challenging, visionary goal etc.

Have you some tips for writing the proposal ?

- You should write so that the proposal is understood by all (panel members are not all experts in your field, maybe one, sometimes nobody).
- Put in clear boxes the objectives and the questions that the project will answer.
- Don’t hesitate to put graphics for explaining
- Look at the jury's evaluation criteria and identify (or highlight) the points that meet them
  - ground-breaking nature, ambition, and potential impact of the research project
    - To what extent does the proposed research address **important challenges**?
    - To what extent are the objectives **ambitious and beyond the state of the art** (e.g. novel concepts and approaches or development between or across disciplines)?

    It is not a question of using this wording but of demonstrating all that (providing arguments for the reviewers).
  - feasibility of the research project and scientific approach
    - Have a small “proof of concept”, so that you can have risks and mitigate the unfeasible project
    - Address the risks
  - required expertise and synergy structure of the proposal
  - intellectual capacity, creativity, and commitment of the applicant principal investigator
  - Very well detailed by Agnes Kulcsar - ERCEA

How did you prepare for the interview?

- This took us a lot of time…
- We have matured the slides.
- We have made them very visual, didactic, beautiful (with movies), structured.
- We have repeated several (many) times and during constructive F2F meetings in order to be well prepared/running/dynamic for the oral
- We have discussed to anticipate all the questions (we had something like 50 slides as reserve for question); this has well prepared us to answer the questions.
- You may have questions from a specialist in the panel, questions from non-specialists in the panel, questions transferred from the external reviewers (very specialists) to the panel members.
- We have discussed who will speak when; which kind of questions we need to take for each of us. But the main coordinator was also directing the question to one of us, if not clear from the start; just looking to each others we knew who it was; if not clear from the start, I was mentioning: this is a question for X; we also took the liberty to complete the answer from one of us; it is important to show that you already have a synergy in the answers of the questions.

Structure for the oral presentation

- Slide 1: Why? (motivation)
- Slide 2: Objectives
- Slide 3: How?
- Slide 4: Further motivation within synergy
- Slide 5: State of the art
- Slide 6 & Slide 7: Planned approach and methodology (WPs)
- Slide 8: Expected breakthrough results
- Slide 9: Risk (with a proof of concept)
- Slide 10 & Slide 11: Working plan (e.g. regular progress meetings, travelling of PhDs and postdoc between institutions, invitation of experts, organization of conference, outreach…)
- Slide 12: Conclusion (actual question answered with a unique combination for break through science)

With below each slides the title of the sub-theme and an indication where we were.

Last tips: same as Jean-François Remacle.

- h-index (very much depending on the field) not really important but high quality papers
- Gender equality: Make sure that this addressed: *Cultural and institutional changes to address gender imbalances require a long-term effort and stress the need to reinforce always the integration of the gender dimension in our daily work. Making use of all talents and creating equal opportunities for men and women is important and is a matter of efficiency.*

How did you look for other PIs ? Did you make use of support services (NCPs, consultancy, internal departments etc.)?

- No, I did not use any support service but rather my own network.
- It is important to consult the literature in the domains complementary to yours, in order to be sure that the chosen collaborators are the right ones.
- It is also important to exchange on the contributions of each of the collaborators.

a) As there can be maximum 4 PIs for this application, is this seen as a weakness if all PIs are from one institution?

- Answered by Agnes Kulcsar - ERCEA

b) If we add a PI from another institution, is the participation of a UK partner allowed?

- Answered by Agnes Kulcsar - ERCEA

c) Can there be co-funded PIs under one of the main PIs to divide certain tasks that require additional expertise.

- Answered by Agnes Kulcsar - ERCEA

- What does "primarily" mean in the sentence “explicitly evaluating primarily the research project” (page 34 of the WP and slide 16 of your presentation) ? Is there a fixed ratio for the project/CV balance in the evaluation? How will marks be given and weighed?

- I think that both are important, no ratio, you must just show that you are the right PIs to perform the project.

- Do the evaluators all use the same evaluation matrix? Is the evaluation matrix available?

- Yes, I think so.

- High risk / high gain is not anymore explicitly mentioned in the work programme. Has this been removed from the evaluation criteria? If yes, does this change anything to the type of projects ERC is looking for?

- For sure you need to have innovation, out-of-the box ideas.
- High risk/high gain sometimes misinterpreted. Proof of Concept good.
- See what Agnes Kulcsar – ERCEA has mentioned.