The H2020 Marie Sklodowska-Curie CREEP Innovative Training Network meets EPOS

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Last February, in Roma, the H2020 Marie Sklodowska-Curie CREEP Innovative Training Network met EPOS. But, let’s start from the beginning... First, what is an Innovative Training Network? A 4-year project funded by the EU-H2020 Marie Sklodowska-Curie Actions, which aims to structure the collaboration in research and in training of young researchers between academic centers and private-sector partners in Europe.

Then, what is CREEP? The word CREEP has multiple meanings, but here CREEP stands for Complex RhEologies in Earth and industrial Processes. Rheology (from the Greek ρειν, “to flow”) is the study of the properties of a material that determine how it flows (or deforms) in response to applied forces. Rheology is a critical issue for numerous industrial and natural processes. Understanding and controlling the rheology of complex fluids is essential for industry sectors with hundreds of billions of euros in annual sales, like processed food, cosmetics, paint, polymers, and glass. It is also essential for predicting the effect of forming processes on the engineering properties of the metallic or ceramic pieces and to optimize the combination of thermal and mechanical processes used in their fabrication. The rheology of rocks is an essential parameter for the dynamics of our planet. On a global scale, the most important evidence for the complex rheology of the Earth is plate tectonics, which corresponds to a highly heterogeneous and localized deformation of the Earth’s surface in response to mantle convection. Complex rheology is a necessary condition for producing strain localization. The “Grand Challenge” is to understand how the different factors that determine the rheology of rocks work together to influence large-scale dynamics of our planet. Rheology is also critical in many fields of Earth Sciences that have a direct societal impact. Estimating earthquakes and tsunami hazard depends essentially on our knowledge of faults rheology. Establishment of safe natural reservoirs for chemical and radioactive waste is contingent on our ability to predict the deformation of these reservoirs and its effect on their sealing capacity over long time spans. Interactions between deformation and fluids are also a fundamental parameter in energy production, both for the extraction of fossil fuels and for the development of clean energy production methods, like geothermal.
In short, CREEP is a coherent platform for training and career development of young scientists in Geodynamics, Mineral Physics, Seismology, Fluid Mechanics, and Materials Sciences. This network, which started in April 2016 and will be active until March 2019, reunites 10 leading academic centers in Solid Earth Sciences* and 11 partner organizations** whose activity encompasses a wide range of fundamental studies and industrial applications in the domain of rheology, bringing together in-depth expertise from six European countries. It provides training to 16 early stage researchers (ESRs), via a structured program of cross-disciplinary collaborative research focused on the complex mechanical behavior of Earth materials or analogs and their implications for geodynamic or industrial processes. This experience-based training is centered on PhD projects, which cover a large spectra of applications, from the deformation of the Earth surface and deep layers, including natural and human-induced seismicity, to a large range of industrial applications, from energy production and waste storage to production of high-performance glasses. Through these projects, the ESRs will acquire skills in experimentation, modeling of deformation at various space and time scales, and seismology. CREEP will also provide the ESRs with: (1) essential career-management skills via courses and practical activities aimed to develop their organizational, management and networking skills and (2) experience and understanding of the impact of research for the private sector via secondments in the industrial partners.

So why and how CREEP met EPOS? One of the major aims of CREEP and of all ITNs is to train the next generation of European Researchers. This certainly means rendering our ESRs aware of the major evolution that represents Open Science and of the major European initiative in this domain for Earth Sciences, which is EPOS. Thus, in the 2nd CREEP workshop, which took place in Roma last February, we invited Massimo Cocco to make a presentation about "Open Science and Ethics Issues: the EPOS experience". His very complete presentation and the animated discussion that followed encompassed many fundamental aspects of this essential, but still poorly understood evolution of our way to produce, store, and share scientific data and of how EPOS can help us in this delicate transition to modern Open Science.