

## 2014 ESWW Session on Space Climate

Space Climate is one of the most rapidly emerging areas of research on space science. The realization that long term variations of the conditions in space are of great relevance to the understanding of the Earth-Sun system is gathering more and more efforts. Among them, the eHeroes project funded by the EC took the initiative of organizing a session at the ESWW to bring in some of the leading experts in Europe and in the rest of the world to assess the current understanding, the leading trends in research and the future directions in space climate research.

The session was organized in two parts with a large audience. The convening room was a very large theater and it was full. While an exact count was not taken, the audience can be estimated to exceed largely one hundred attendees. The audience was also very engaged with questions and lively discussions.

The first session focused on the evidence for long term variability and on its root causes, discussing topics like the long terms variability of magnetic field on the Sun and on the Earth, of its intensity and variability and the long term trends in sunspots. the second session focused more on the Earth impact, focusing on the relevance od space climate to Earth climate, with contributions relative to the links between space and global temperatures, wind patterns, lighting.

Special attention was devoted to understanding the extremes, such as Carrington-like events, or extended minima such as the Maunder minimum, and their implications for the Earth climate. High energy particle population in the Earth space environment was also addressed, evaluating its long term variability and linkage with the larger scale Sun-Earth connection.

The focus of the session has been to understand the causes of space climate, its mechanisms of evolution and the paths linking solar activity and Earth environment. The focus was both on the space environment of the Earth (and other planets) and on the Earth climate and atmosphere. Overall, the progress made has been impressive and this area of research is one of the liveliest. The path ahead remains arduous and challenging. But the rewards will come when from the current state of tentative suggestions, more firmly statistically sound estimates and predictions will become possible.

The space climate session had a synergy between invited review talks and contributed new developments allowing the audience to learn the state of the art in the field and its pioneering advancements. The success has been so great as to require a follow up at the next ESWW in 2015.