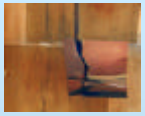


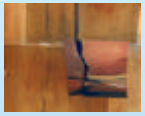
COST Action on Space Weather : at the edge of its start

Jean Lilensten, coordinator
Laboratoire de Planétologie de Grenoble, FRANCE

COST - European **Co**operation in the field of **S**cientific and **T**echnical Research

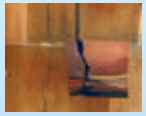
- Funds what?
  - Only coordination of science and technical research activities
  - Only travels of Management Committee (MC)
  - Only 2 members of MC per participating state
  - Only up to 3 MC meetings per year
- Funds who?
  - 32 member states eligible to participate in actions
  - encourages links with non-COST states (eg USA, Canada, Russia…)
- How much and for how long?
  - 50-60keuro for up to 4 years

Organized in different « technical comitees (TC)» (about 40) : telecommunication, meteorology, etc...



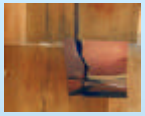
COST Action on Space Weather : Action 724 **Developing the scientific basis for monitoring, modelling and predicting Space Weather**

- Initiated by the ESA SWWT
- First coordinated by Toby Clark (now at ESOC)
- Main objective
  - **to develop within a European framework the scientific basis of space weather applications, and to explore methods for providing a comprehensive range of services to a variety of users, based on modeling and monitoring of the Sun-Earth system.**



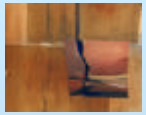
COST Action on Space Weather : Action 724

- The general aims of the Action:
  - To *coordinate* research into improving modeling and prediction of space weather
  - To promote where necessary the deployment of new *instrumentation* to satisfy data requirements, and the development of new *models*
  - To *educate* potential users of space weather data
  - To gather feedback from *users* which may be used to improve services
  - To develop a *forum* for exchanging “best practice” among users and providers of space weather services
  - To set *standards* on data exchange



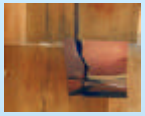
COST Action on Space Weather : Action 724

- Four Working Groups
  - **WG1 Monitoring and predicting solar activity for Space Weather**
  - **WG2 The radiation environment of the Earth**
  - **WG3 Interaction of solar wind disturbances with the Earth**
  - **WG4 Space Weather Observations and Services**
- General Aims of WGs 1-3
  - **research modelling and forecasting**
  - **To promote where necessary deployment of new instrumentation to satisfy data requirements, and development of new models**
  - **set up data bases of measured effects**
  - **match outputs to user requirements**
- Aim of WG 4
  - **To develop coordination, promote services, advertise SW, education ...**



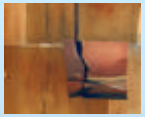
WG1: Monitoring and predicting solar activity for Space Weather

- To research the use of solar observations (eg. extreme ultraviolet images, X-ray observations, radio emissions) and models (eg. magneto-hydrodynamic models of flux tubes) for predicting energetic particle events;
- To research the use of solar observations and models (as above) for predicting coronal mass ejections;
- To research the modelling and prediction of solar extreme ultraviolet radiation (EUV) which affects atmospheric density and hence drag on satellites at low Earth orbit altitudes.
- *To liase with COST Action 271* where monitoring and modelling of solar activity is relevant to ionospheric radio propagation;
- Liase with WG4 to ensure relevant data and models are incorporated in a European Space Weather Network.



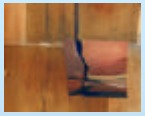
WG2: *The radiation environment of the Earth*

- To develop a quantitative model of the interaction of solar energetic particle events with the Earth's magnetosphere;
- To develop a quantitative model of the development of trapped radiation in the Earth's magnetosphere during geomagnetic storms;
- To develop a quantitative model of the variation of galactic cosmic radiation in response to solar activity;
- To study how electronic technology in satellites, launchers and aircraft is affected by the Earth's radiation environment;
- To study how humans are affected by solar and cosmic radiation in different activities (eg. astronauts, aircrew, air passengers, on the ground).
- To set up and maintain a database of recorded effects on electronic technology and human health;
- Liase with WG4 to ensure relevant data and models are incorporated in a European Space Weather Network.



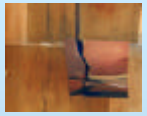
WG3 *Interaction of solar wind disturbances with the Earth*

- To develop a quantitative model of the propagation of observed coronal mass ejections (CME) through the interplanetary medium to predict their arrival at Earth;
- To develop a quantitative model to predict geomagnetic storms and ionospheric current systems from observations of the solar wind;
- To liase *with COST Action 271* where modelling of the ionospheric response to geomagnetic storms is relevant to ionospheric radio propagation;
- To develop the capability to model electric fields induced in the ground by geomagnetic storms;
- To set up and maintain a database of recorded effects of geomagnetic storms on technological systems;
- Liase with WG4 to ensure relevant data and models are incorporated in a European Space Weather Network.



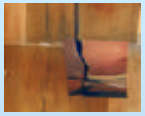
WG4 Space Weather Observations and Services

- Aims of research
  - Coordinate a network of European websites relevant to data, models, prediction and public outreach;
  - Develop methods and standards for data exchange to enable coupling of different space weather models and to disseminate relevant information to users;
  - Liaise with COST Action 271 to let COST 271 benefit from space weather model development and to incorporate COST 271 output where it will be of benefit to other space weather services;
  - Maintain databases of users and statistics about the service



Management Committee

- Organises and oversees coordination of Working Group activities
- Organises annual seminars/workshops
- Coordinates publication of refereed articles on space weather, and organises regular workshops
- Promotes public outreach with lectures, general articles etc.
- Liases with other SW structures such as COST 271, with SWWT and ESA, ESF, E-Star, with meteorology and climate (Technical Committee) ...



COST Action on Space Weather : Action 724

Current status of Proposal

- Accepted in April 2002. Technical Committee *Meteorology*
- Inaugural meeting : 24th of November, 2003
- Coordination not finished. Countries are welcomed and can join even after the inaugural meeting

website : http://cost724.obs.ujf-grenoble.fr/

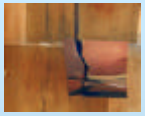
Action : 724

Party	Date of signature
Austria	05/07/2002
Belgium	15/11/2002
Bulgaria	20/11/2002
Czech Republic	17/03/2003
Denmark	12/09/2003
Finland	09/10/2002
France	09/10/2002
Germany	09/10/2002
Greece	09/10/2002
Hungary	16/10/2002
Italy	15/10/2002
Poland	14/01/2003
Slovakia	17/03/2003
Spain	07/11/2002
Sweden	16/06/2003
Switzerland	05/05/2003
United Kingdom	09/10/2002
Total	17

Associate intitutions :
ESA, ESOC (?)

Next countries to (hopefully) join :
Turkey
Norway
Portugal

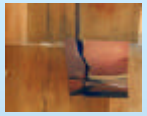
This makes it already one of the largest COST actions (and hopefully one of the most successful)



•COST gives priority to research: applications are studied and advertised but not realised

• Only *official* structure in Europe with synthetic view of SW

• Will set important links :
  • COST 271 (B. Zolesi, Lj. Cander)
  • meteorology and climate (Technical Committee; E-Star)
  • SWWT and ESA
  • ESOC (Toby Clark)
  • ISES ...



•COST 724 people have vocation to belong to scientific committee for IP, PP, NoEx …

•COST will start to work on defining the future SW standards (data formats …)

Therefore, if your country did not join yet, put pressure on your national communities (STP but also need for physicians, meteorologists, economists, sociologists, sismologists…) and make sure your country signs the MoU

If your country already signed, get in contact with your National representatives and make sure they set a national discussion group. Look for national fundings

In any case, do not hesitate to contact me (although I am rather difficult to reach):

33 - 4 - 76 51 41 49

jean.lilensten@obs.ujf-grenoble.fr