



EMI



MENESFCRS of
Morocco

SCHOOL ON SPACE WEATHER

Rabat/Morocco [5-16 December, 2011]

Brief report

- I. Committees
- II. Objectives
- III. Professors
- IV. Training
- V. Participants
- VI. Sponsors
- VII. Photos

Christine Amory-Mazaudier
Scientific secretary

Abderrahmane Touzani
Director of the CRASTE-LF

Nicole Vilmer
President of the French
National ISWI Committee

I. ORGANIZING COMMITTEES

Local Committee

CRASTE –LF

Centre Régional Africain des Sciences et Technologies de l'Espace– Langue française

EMI

Ecole Mohammadia d'Ingénieurs



MENESFCRS

**Ministère de l'Education Nationale, de l'Enseignement Supérieur, de la Formation des Cadres
de la Recherche Scientifique**

International Scientific Committee

C. Amory-Mazaudier -> scientific secretary

Jean-Luc Attié

Mohammed Bendouida

Karine Bocchialini

Dominique Fontaine

Jean-François Georgis

Samir Kadir

F. Pitout

Serge Soula

Art Richmond

Hamid Touma

Nicole Vilmer

II. OBJECTIVES

In the framework of the international ISWI (International Space Weather Initiative <http://www.iswi-secretariat.org>), a school on Space Weather was held at Rabat from December 5 to 16, 2011 at the CRASTE-LF.

The main objective of this school was to perform research in the African countries (French Language) in order to permit the participation of many African scientists to International project as ISWI.

The two key points were:

- 1) To learn how to use the existing data sets and the scientific tools related to space weather.
- 2) To use the data recorded in Africa since several years by the instruments deployed in the framework of international project as International Heliophysical Year (IHY 2005-2009) and still deploy in the framework of ISWI. **At that time less than 10% of the data sets recorded in data bases are used**
- 3) To combine data from satellites to ground data to develop a sustainable research on Space weather in the African countries (*for example to use the GPS data for Geophysics studies, navigation ...*)

To reach these objectives the training included:

- 1) A scientific part to understand the data and all the informations extracted from the data useful for space weather applications
- 2) Practical work on computers to use the data from existing data base SOHO, SPIDR, IGS1; IGRF etc...

The scientific part concerned:

- 1) The knowledge on the impacts of solar activity and solar events on the Earth's environment : magnetosphere ionosphere atmosphere,
 - a. Knowledge on the recent discoveries concerning the sun,
 - b. Study of the impact of the sun on the Ionized layers around the earth,
 - c. Understanding of the sun impacts on the terrestrial atmosphere,
 - d. Understanding of the use of tools as GPS for applications other than scientific applications as for example navigation.
- 2) The use of existing data in the different data bases (old data) and the new data recorded with the instruments deployed in the framework of International projects.

This school had for main object to develop the data analysis in Africa and therefore to have benefit of all the scientific projects base of the deployment of scientific instruments in Africa as IHY (International Heliophysical Year) or ISWI (International Space Weather Initiative) etc...

IV. PROFESSORS

1 ^{ère} week 5-10 December		
	NAME	LABORATORY
1	BOCCHIALINI Karine Karine.bocchialini@ias.u-psud.fr	Institut d'Astrophysique Spatiale Bât 121 Université Paris 11, 91405 Orsay cedex, France
2	FONTAINE Dominique Dominique.fontaine@lpp.polytechnique.fr	Laboratoire de Physique des Plasmas (LPP) Ecole Polytechnique, Route de Saclay 91128 Palaiseau cedex, France
3	HILGERS Alain Alain.Hilgers@esa.int	ESTEC Keplerlaan, 1, PO Box 299, 2201 AZ, Noordwijk, Pays Bas
4	KLEIN Karl-Ludwig Ludwig.klein@obspm.fr	Observatoire de Paris 5 Place J. Jansen 92195 Meudon, France
5	PITOUT Frédéric frederic.pitout@cesr.fr	Institut de Recherche en Astrophysique et Planétologie (IRAP) 9 avenue du Colonel Roche BP44346 Toulouse cedex 4, France
6	VILMER Nicole Nicole.vilmer@obspm.fr	LESIA Observatoire de Paris 5 Place J. Jansen 92195 Meudon, France
2 nd week 12-16 December		
1	AMORY-MAZAUDIER Christine Christine.amory@lpp.polytechnique.fr	Laboratoire de Physique des Plasmas (LPP) Polytechnique UPMC, 4 Avenue de Neptune 94107 Saint-Maur-des-Fossés, France
2	BLANC Elisabeth Elisabeth.blanc@cea.fr	CEA/ Département d'analyse et de suivi de l'environnement, Bruyères le Chatel, 91297 Arpajon cedex, France
3	GEORGIS Jean-François geojf@aero.obs-mip.fr	Université Paul Sabatier Observatoire Midi Pyrénées Laboratoire d'Aérodologie, 14 avenue Belin 31400 Toulouse, France
4	RICHMOND Art richmond@ucar.edu	National Center for Atmospheric Research, High Altitude Observatory, Boulder, CO 80301, USA
5.	OUATTARA Frédéric fojals@yahoo.fr	Université de Koudougou/Burkina Faso he will work at NCAR/HAO in 2012
6.	SOULA Serge sous@aero.obs-mip.fr	Observatoire Midi Pyrénées Laboratoire d'Aérodologie, 14 avenue Belin 31400 Toulouse, France

V.TRAINING

PROGRAMME		
1 st week 5-10 December		
1	BOCCHIALINI Karine Karine.bocchialini@ias.u-psud.fr	Sun : General presentation
2	FONTAINE Dominique Dominique.fontaine@lpp.polytechnique.fr	The magnetosphere
3	HILGERS Alain Alain.Hilgers@esa.int	Space Weather : the effects
4	KLEIN Karl-Ludwig Ludwig.klein@obsmp.fr	Sun : Radio observations
5	PITOUT Frédéric frederic.pitout@cesr.fr	Ionosphere : magnetic storms
6	VILMER Nicole Nicole.vilmer@obsmp.fr	Sun : solar activity
2 nd week 12 -16 December		
1	AMORY-MAZAUDIER Christine Christine.amory@lpp.polytechnique.fr	The transient variations of the terrestrial magnetic field
2	BLANC Elisabeth Elisabeth.blanc@cea.fr	Atmosphere : dynamics and perturbations
3	GEORGIS Jean-François geojf@aero.obs-mip.fr	Radiometry of the atmosphere
4	OUATTARA fojals@yahoo.fr	GNSS: Use of GPS to study the equatorial ionosphere
5	RICHMOND Art richmond@ucar.edu	Ionosphere : Electrodynamics
6	SOULA Serge sous@aero.obs-mip.fr	Atmospheric electricity

V. PARTICIPANTS

There were 28 participants from 11 African countries supervised by 12 professors (see list above): see below the list of the participants and on the next page the map with the countries of all the participants.

Participants		
	NOM	Pays
1	ACKAH Jean Baptiste jeanbaptisteackah@yahoo.fr	Côte d'Ivoire
2	ADECHINAN Adebisi Joseph adechinanajoseph@yahoo.fr	Benin
3	ANAD Fatma f_anad@yahoo.fr	Algeria
4	AZZOUZI Ilyasse ilyasse.azzouzi@gmail.com	Morocco
5	BARRO Fabé Idrissa Fabe.barro@ucad.edu.sn	Senegal
6	BENGHANEM Karima kbenghanem@yahoo.fr	Algeria
7	DAASSOU Ahmed Daassou1@yahoo.fr	Morocco
8	ENOW Richard Agbor enow_r@yahoo.fr	Cameroon
9	GAYE Idrissa idrissagaye3@hotmail.com	Senegal
10	GRODJI Franck franckgrodj@yahoo.fr	Côte d'Ivoire
11	GUEMENE DOUNTIO Emmanuel eguemene@yahoo.com	Cameroon
12	HOUNGNINOU Bodoun Etienne houngb@yahoo.fr	Benin
13	KAFANDO Pétronille kafandopetronille@yahoo.fr	Burkina Faso
14	KAHINDO Bruno bkahindo@gmail.com	RDC
15	KASMI Atika kasmiatika@gmail.com	Morocco
16	KOUASSI Komenan Benjamin benjamin.kouassi@gmail.com	Côte d'Ivoire
17	MADOUGOU Saïdou nassara01@yahoo.fr	Niger
18	MBANE César cesar.mbane@yahoo.fr	Cameroon
19	MALKI Khalifa mkprocedure111@gmail.com	Morocco
20	NDOMBI TSHISUNGU Christian chris_ndombi@yahoo.fr	RDC
21	OUATTARA Frédéric fojals@yahoo.fr	Burkina Faso
22	RANDRIANARINOSY Fanomezana fano.rn@gmail.com	Madagascar
23	SIDI CHEIKH Mohamed Ahmed ouldsidicheikh@yahoo.fr	Mauritania
24	TANOI Serge Serge.koua@yahoo.fr	Côte d'Ivoire
25	TIERMONDO LONGANDJO Georges georgesnoeltiers@yahoo.fr	RDC
26	ZAOURAR Naima naimazaourar@gmail.com	Algeria
27	ZERBO Jean-Louis Jeanlouis.zerbo@gmail.com	Burkina Faso
28	ZOUNDI Christian zounchr@yahoo.fr	Burkina Faso



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Department of Peacekeeping Operations
Cartographic Section



VI. SPONSORS

This school was financially supported by

French Institutions

CNES: Centre National d'Etudes Spatiales

French Embassy in Algeria,

French Embassy in Côte d'Ivoire,

French Embassy in Morocco,

CEA: Commissariat à l'Energie Atomique,

NASA: Spatial US Agency,

ICG/UN-OOSA: International Committee of GNSS - Office for Outer Space Affairs of United Nations,

CRASTE-LF: African Regional Centre of Space Sciences and Technology Education in French Language,

EMI: Ecole Mohammadia d'Ingénieurs,

ISESCO: Islamic Education Sciences and Culture Organization,

RDC : Republic Democratic Congo

Cost : 47405,49€

	French Institutions	NASA	ICG/UN-OOSA	CRASTE-LF	ISESCO +RDC
Transport	10479,67€	2464€	7375,44€	0€	1244€
Accommodation + meals	8182,93€	11618€	0€	458€	0€
Rooms	0€	0€	0€	6041,45€	0€
Total	18662,93€	14082€	7375,44€	5970,51€	1244€
Percentage	39,36%	29,7%	15,55%	12,74%	2,62%

1 € -> 1,33\$

1 € -> 11,06 DH

VII.PHOTOS

Photo: 1st week



Photos : 2nd week



Lecture room



Computer room

