題名　ISWI Newsletter - Vol. 5 No. 042
差出人　George Maeda

****
* ISWI Newsletter - Vol. 5 No. 042 10 April 2013 *
*
* I S W I = International Space Weather Initiative *
* (www.iswi-secretariat.org) *
*
* Publisher: Professor K. Yumoto, ICSWSE, Kyushu University, Japan *
* Editor-in-Chief: Mr. George Maeda, ICSWSE (maeda[at]serc.kyushu-u.ac.jp)*
* Archive location: www.iswi-secretariat.org (maintained by Bulgaria) *
* [click on "Publication" tab, then on "Newsletter Archive"] *
* Caveat: Under the Ground Rules of ISWI, if you use any material from *
* the ISWI Newsletter or Website, however minor it may seem *
* to you, you must give proper credit to the original source. *
****

Attachment(s):
(1) "Morocco GNSS Master Project", 720 KB pdf, 5 pages.
(2) "Carte_coordinates_GPS_Stations_Morocco", 800 KB pdf, 2 pages.
(3) "Institut Scientifique Maroc", 300 KB pdf, 7 pages.

: Re:
: Space Weather news from Morocco
:
:

Dear ISWI Participant:

I am pleased pass along to you the following note from Prof. Anas EMRAN of Morocco. The note came with three pdf's, which are attached to this email. I am eager to circulate more news from Africa. So if you are based in Africa, please send to me your space weather news.

==========
:
: Dear George
:
: Hoping that this message finds you in good health,
: I'm writing to have your news and to tell you something
: new about the advent of the Space Weather in our country.
:
: In this connection, I inform you that Ionosphere Observation
: is an ancient practice of our university in Rabat, which
: dates back to the 20s of last century, through the Scientific
: Institute observatories placed in the four corners of Morocco,
: particularly station Averroes object of the document I sent
: you last time.
:
: In addition, our university was launched in September 2012
: a Master Certified Science and Technology Space: Option Remote
: Sensing & GIS and Satellite Meteorology and Global Climate
: CRASTE in partnership with the UN-affiliated LF and several
: national and international institutions. Students of the
: Master are from several countries in the region (Algeria,
: Cameroon, Mali, Gabon, Mauritania, Morocco, Niger, Senegal,
: Togo and Tunisia).
:
: Another Master will be launched in parallel from September
: 2013 on GNSS and spatial Telecommunications, also organized
: in partnership with the CRASTE-LF and the support of several

: national and international organizations, including the
: Office for Outer Space Affairs of the UN (UNOOSA).
: this Master the use of GPS data and Technologies (But as
: Galileo, GLONASS etc..) Will be in the foreground.
:
: Finally, I'm sending you a card attached file describing all
: existing GPS Coordinates Morocco particular permanent
: GPS stations of the National Agency for the Land Conservation,
: Land Registry and Mapping (ANCFCC) and those belonging to
: the University Mohammed V Agdal Rabat.
:
: We are always available to increase our collaboration and
: develop "Space Weather" in your company, in our country and
: throughout the African country with which we share the
: knowledge and research.
:
: sincerely
: Anas
:
: Prof. Anas EMRAN
: Institut Scientifique / Univ Mohammed V-Agdal
: Chef de Departement des Sciences de la Terre
: Responsable de l'UR "Teledetection, Ressources et Risques Naturels"
: Coordinateur pedagogique - CRASTE-LF 'affilie a l'ONU'
: GSM : +212 668461783 / Tel. : +212 661822847
: Fax: +212 537774540
: emrananas@yahoo.fr; emran@israbat.ac.ma
:
==========

Most faithfully yours,
: George Maeda
: The Editor
: ISWI Newsletter

Affiliated to the UN

Global Navigation Satellite System

Modules of the Master

February 2013

Materials of Semester 1	Contents	VH
Module 1 : Basic Mathematics		**80**
Reminders Mathematics	• Complex analysis • Numerical Analysis • Geometry of surfaces	25
Signal processing	• Basics of analog signal processing and digital • Fourier analysis • Signal acquisition • Signal processing	25
Statistics	• Descriptive analysis (mean, standard deviation, variance ...) • Statistical modeling of spatial data • Interpolation methods	30
Module 2 : Basic physical		**80**
Electronics	• Mathematical Foundations • Electrical signals • Electronic components • Electronic circuits • Transmitters, sensors	30
Space mechanics	• Components and types of satellites • Keplerian Elements • Modeling the movement of satellites • Description and orbit determination	30
Earth Physics	To be completed by the team of the Scientific Institute	20
Module 3 : Computers		**80**
Databases	• Development cycles • Stages of design • Relational databases • Database objects • Analysis databases	16
Object-Oriented Programming	• Fundamental OO programming • Encapsulation, inheritance and polymorphism • Constructors and destructors • Virtual methods, dynamic and abstract • Visibility • Variables and Operators • Conditions and loops and arrays • Class methods • Classes • Object modeling	24
Network architecture and protocols	• Signaling and modulation • LAN • Connection diagrams • Data Services • TCP / IP • ATM	24

Embedded Systems	• Types of embedded systems • Features and Architecture • Programming languages • Fields of application	16
Module 4 : Signals and Receivers		**80**
Structure and transmission of signals	• Standard signal transmission • Signal structure • Signal Processing • Coding techniques	40
Receivers	• Architecture receivers • Types of antennas and components • Propagation of electromagnetic waves • Atmospheric effects • Sources of errors • Navigation algorithms • Filtering • Modulation techniques	40
Materials of Semester 2	**Contents**	**VH**
Module 5 : Fundamentals of Geodesy and Topography		**80**
Geodesy	• Ellipsoid of revolution • Types of repositories • Geodetic coordinate systems • Transformations between coordinate systems • Measurements and errors in geodesy • Law of propagation of errors • Principle of least squares • Compensation methods : Method of condition method of variation of parameters • Map projections	50
Physical geodesy	• Gravimetry • Leveling • Geoid determination.	12
Digital topography	• Measures of angles, distances and height differences • Measurement errors • Processes topographic horizontal and vertical • Survey methods and Instrumentation digital survey • Processing and automatic establishment plans	18
Module 6 : Positioning Satellite		**80**
Introduction to Systems Global Navigation Satellite System (GNSS)	• Scientific positioning systems. • Study of global systems GPS, GLONASS, Galileo, COMPASS : – Historical – Segments – Reference systems – Services available – Signal structure and messages • Regional systems (IRNSS, QZSS, ..)	20
Processing GNSS observations	• Types of GNSS measurements	60

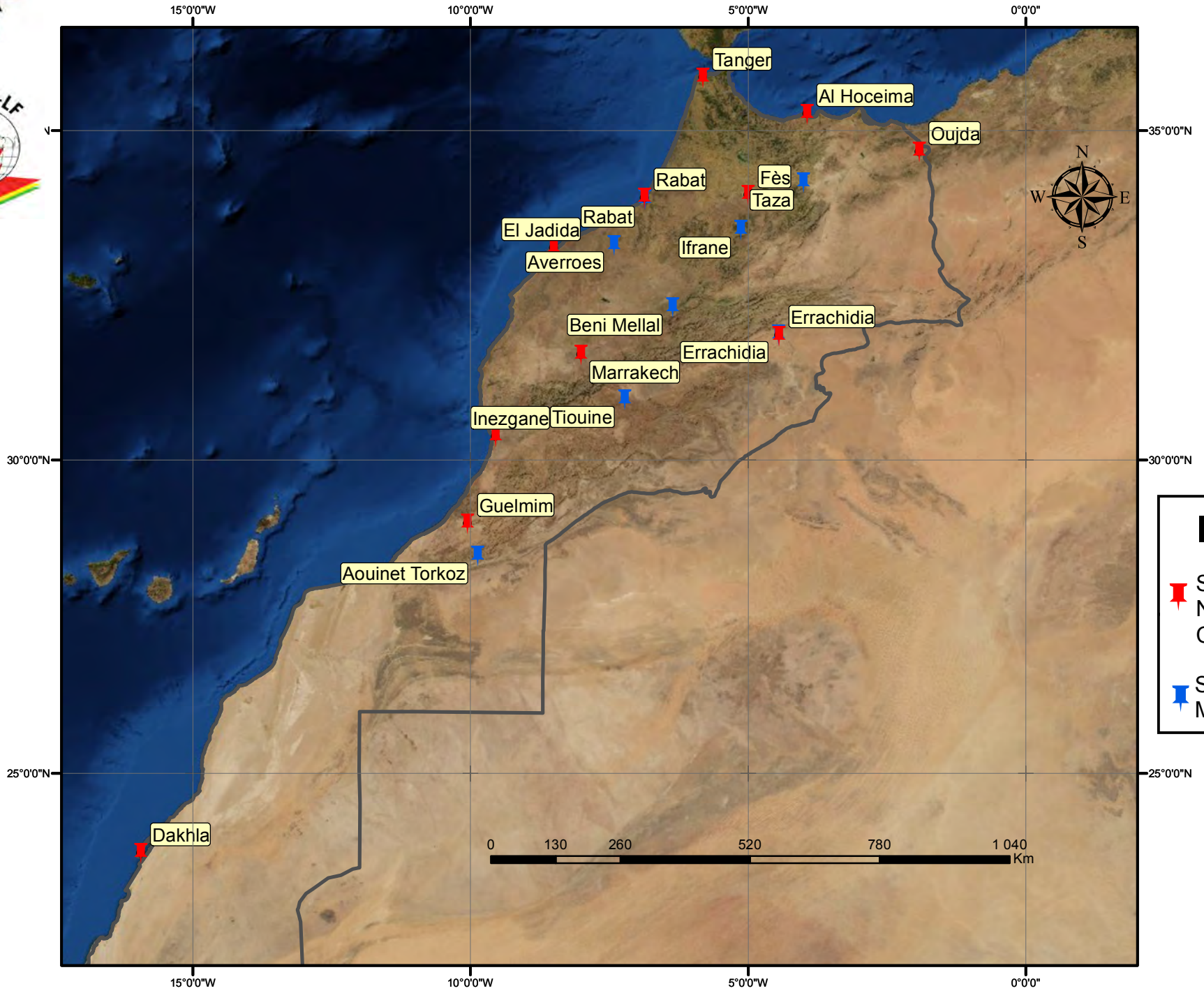
	• Noise measurements • Mathematical model by measuring Doppler • Mathematical model by measuring pseudorange • Mathematical model by phase measurement • Linearization and filtering • Detection of cycle slips • Combination of measures • Resolution of ambiguities • Methods adjustments • Quality indicators positioning	
Module 7 : Techniques for positioning and navigation satellite		***80***
Technical positioning and navigation	• Autonomous positioning methods • Methods of precise positioning • Dynamic positioning methods	40
Differential positioning and augmentation systems	• Principle • Differential systems • Solution of differential positioning • Augmentation systems (EGNOS, WAAS, MSAS, GAGAN) • Assisted positioning • Geo-location by mobile network • Permanent stations	40
Module 8 : Practices positioning techniques		***80***
Precise static positioning		40
Kinematic positioning and real-time kinematic		40
Materials of Semester 3	**Contents**	**VH**
Module 9 : Representation of geographic data		***80***
Cartography	• Representation of topographic data • Representation of qualitative and quantitative data • Preparation of maps and Skin	20
Web-Mapping	• Foundations, software architectures, programming languages, standards.	20
Design of geographic databases		20
Mini-Project (part [1] of the pilot project)	Thematic applications of GNSS	20
Module 10 : Management of geographic data		***80***
Geographic Information Systems	• Components of GIS • Data Types • Acquisition and Preprocessing • Spatial analysis • Thematic analysis • Spatial modeling • Geographic databases • Standards	50
Mini-Project [2nd] part of the pilot project)	Thematic applications of GNSS	30
Module 11 : GNSS Applications thematic and Complementary Systems		***80***
Thematic applications	• Geodesy, Photogrammetry and Cartography	40

	• Civilian navigation • Civil engineering works and auscultation • Precision agriculture and natural resources • Lands, cadastre • Disaster Monitoring • Regulatory and Legal Aspects of GNSS	
Inertial systems	• Operating principle and Technologies • Measuring acceleration, angle and angular velocities • Reckoning • Coupling (reckoning and satellite navigation)	20
Mini-Project (3rd element of the pilot project)	Thematic applications of GNSS	20
Module 12 : Communication and Project Management		***80***
Technical English		20
Project Management		20
Mini Project (4th element of the pilot project)	Thematic applications of GNSS	40
Materials of Semester 4	**Contents**	**VH**
Module 13, 14, 15, 16: Final Project study		***320***

Published by SERC of Kyushu University
I S W I Newsletter
under the auspices of the United Nations

This pdf circulated in Volume 5, Number 42, on 10 April 2013.

Stations GPS du Maroc



Legend

- Station de l'Agence Nationale de La Conservation Foncière
- Stations Université Mohammed V Agdal

GPS stations in Morocco

University Mohammed V Agdal Rabat:

Station	Latitude	Longitude	height (meters)
Aouinet Torkoz	28,4833	-9,8667	311
Tiouine	30,9366	-7,2225	1268
Errachidia	31,9329	-4,4531	1039
Beni Mellal	32,3502	-6,3588	490
Averroes	33,2983	-7,4133	230
Taza	34,2295	-3,9964	466
Rabat	33,98	-6,86	36,4
Ifrane	33.51690	-5.12694	1630

Coordinates of permanent GPS stations of the National Agency for the Land Conservation, Land Registry and Mapping (ANCFCC)

Site		Coordinates géographiques			ha(m)
		Latitude (N)	Longitude(W)	height (m)	
Rabat	**RBAT**	33.9979	-6.8642	89.430	0.192
El Jadida	**JDID**	33.2480	-8.5019	65.703	0.193
Marrakech	**MARK**	31.6278	-8.0048	519.801	0.193
Tanger	**TANG**	35.7792	-5.8101	111.386	0.192
Al Hoceima	**HOCM**	35.2469	-3.9378	146.369	0.193
Oujda	**OUJD**	34.6841	-1.9178	610.904	0.193
Fès	**FES_**	34.0389	-4.9958	461.582	0.193
Errachidia	**ERRA**	31.9234	-4.43870	1092.046	0.193
Inezgane	**INZG**	30.3633	-9.5471	70.365	0.193
Guelmim	**GULM**	29.0016	-10.0489	370.289	0.193
Dakhla	**DKHL**	23.6860	-15.9407	58.870	0.193

Published by SERC of Kyushu University
I S W I Newsletter
under the auspices of the United Nations

This pdf circulated in Volume 5, Number 42, on 10 April 2013.

Université Mohammed V
AGDAL - RABAT

SCIENTIFIC INSTITUTE OF MOROCCO

Introduction and Objectives :

The **Scientific Institute** (http://www.israbat.ac.ma/) is the oldest university research in Morocco. It was created January 24, 1920, under the name of Chérifien Scientific Institute, an institution that has played a fundamental role in the development of scientific research in several fields such as meteorology, geology, geophysics, geomorphology, remote sensing, zoology and botany.

The purpose of the Scientific Institute was set up by royal decree, in the Official Gazettes of 1920, 1921, 1933, 1975 and 2004. The text of this vocation, given below, has not changed since the inception of the SI.

Official Bulletin No. 5222 Thursday, June 17, 2004: Decree No. 2-04-89 of 18 Rabii II 1425 (June 7, 2004): setting the vocation of universities, higher education cycles and the corresponding national diplomas. Chapter III, Article 13

In replacement of Decree No. 2-75-663 of 11 Shawwal 1395 "15/10/1975 establishing the role of academic institutions and the list of degrees which they ensure the preparation and issue:

"The Scientific Institute is to conduct in the field of natural science basic research, particularly with regard to flora, fauna and soil. It is further responsible for systematic inventory of the physical environment and biological, to build collections of a museum of natural history, to bring together the elements of a scientific library and equip laboratories, observatories and stations necessary for his research "

The activities in the SI are primarily focused on fundamental research areas. They cover most areas of the natural sciences, particularly the Earth Science (Earth physics, geology, geomorphology and cartography, remote sensing in

geology) and Life (zoology and animal ecology and botany and plant ecology), and aim to take inventory of all natural resources of Morocco (fauna, flora and subsurface resources), in harmony with national priorities for conservation of natural heritage, the environment, education and development.

SI researchers are also developing work in the context of service delivery, research projects applied to the environment, and great works, both marine and continental.

In addition to their research, the faculty members of the SI are actively involved in university teaching and mentoring young researchers, in close collaboration with other academic institutions of the country, and contribute to education and public awareness in environmental protection.

Directors of the Institute since its inception to the present:

1. Dr. Liouville (1920-1938)
2. J. of Lepiney (1938-1942)
3. J. Marcais (1942-1946)
4. L. Pasqualini (1946-1960)
5. Ch Sauvage (1960-1962)
6. J.B. Panouse (1962-1966)
7. H. Msougar (1966-1989)
8. D. Najid (1989-1999)
9. Mr. Saghi (1999-2006)
10. A. El Hassani (2006 - present)

- Structures and organization

Proposal on the Establishment of the Council of the Council of the University Mohammed V Agdal adopted the new departmental structure of the Scientific Institute as follows:

Department of Botany and Plant Ecology

Department of Earth Sciences (including the merger of the former departments of geology, Earth Physics, mapping and remote sensing and geomorphology)

Department of Zoology and Animal Ecology

Besides the three departments, the Institute has four services directly related to research:

National Museum of Natural History

Publishing and Documentation

Geographic Information System Internet

Finally, the Institute has external services (biological stations and geophysical observatories) based in different regions of the country, and whose creation in 1934 (Observatory Averroes). These observatories and stations are located at:

- Ifrane (Middle Atlas and Rif)
- Averroes 17 km east of Berrchid (Plains and Plateaux Atlantic)
- Tiouine 40 km west of Ouarzazate (High Atlas and Anti-)
- Aouinet Torkoz, in the province of Assa-Zag (southern Morocco)

Observatory AVERROES:

- **Historical**

In 1930, the organization of the Scientific Institute has been extensively reworked, and its weather service expanded into all branches of Earth Physics in giving birth to the Service (or section) of Earth Physics and Meteorology. This new organization had to meet the needs of geophysical and meteorological order. Its functions were determined by a Vizierial Order of 1933 and are located in Casablanca; it includes an observatory (Averroes), the regional stations of meteorology and climatology network. Immediately, work began at the Observatory Averroes, located in the plain of Chaouia on the road to el Gara Berrechid, 17 km from the center of Berrechid. Cellars will be constructed of concrete to a depth of 7 m and will be overcome by any building, all will be topped by a concrete slab independent walls. The pillars which will be deposited independent seismological devices down to a depth of 50 m below the floor of the cellar.

1 January 1934 the first pavilion (cellars seismology, gravity and time) of the Observatory Averroes is completed. Various measurement activities will then be transferred to Casablanca (SPGM seat) at the Observatory Averroes, these include meteorology and actinometry.

- **Seismology**

Until 1937 Morocco does not yet have a seismograph, the Earthquakes were reported by observers of weather stations, the largest shocks were recorded by stations or the Spanish Observatory of Algiers, but many would go unnoticed by result of being away.
In that year, the BCSS had recommended the installation of a seismograph at the observatory Averroes, but various difficulties, including soil compaction, which are built on the pillars, have delayed the final commissioning of the station.

On 1 June 1937, the two horizontal seismographs (NS and EW) Mainka mass of 450 kg (Photo left) began recording, their period is about 12 s, and the records are on paper in black smoke. In the early sixties, a third vertical seismograph cal Grenet-Coulomb-type will be added to the other two. By the mid-seventies, the records will be in ink.
In 2006, as part of cooperation between the Scientific Institute on the one hand and the Universidad Complutense de Madrid (UCM) and the Real Instituto y Observatorio de la Armada in San Fernando (ROA) on the other hand, a broadband station type is installed at the Observatory Averroes. The latter is on the Internet to receive real-time recordings at the Scientific Institute in Rabat and also shared with the Spanish partners of ROA and UCM.

- **Gravimetry**

The first determination of the absolute value of gravitational acceleration g in Morocco in 1933 was made at the Observatory Averroes with a clock which was set at 979,583 mgal. A decade later this value was recalculated using pendulums and was set at 979,562.9 mgal. It is this fundamental value that was used as the starting value of the Gravity Map of Morocco from 1952.

- **Magnetism**

In November 1966, a magnetic observatory was established in Averroes, he was equipped to act as an observatory of conventional type. Measurements of relative variations of the geomagnetic field were made by the Court system associated with a recorder on photographic paper. This is a QHM (Quartz Horizontal Magnetometer) for the horizontal component of the field, a theodolite Chasselon for the angle of declination and a proton magnetometer ELSEC 595 for the total field strength F . Measurements began regular ways from 1967 to 1994.

From April 2003, a new digital acquisition system geomagnetic data has been established.
The control equipment of the geomagnetic field variations and the base lines consist of:
1) a magnetometer (fluxgate), mounted on theodolite (Type 010A Zeiss) and equipped with readout electronics, measuring declination and inclination to an accuracy of 1 arcsecond.
2) a system that allows recording didd permanent magnetic components of the 5 F, D, X, Y, Z. The sampling interval is 5 s for all data connected to a PC.

- **GPS :**

According cooperation agreements between ROA (Cadiz, Spain) and the SI was a GPS station installed in 2008 at the Observatory Averroes and is connected to the Internet to receive real-time recordings.
Following the recent rehabilitation of the Observatory (2009), it is home work rooms and courtyards, libraries and museums.

Among the tasks that we began to encourage at this observatory, the visit of students of the Primary and Secondary, but also students in biology and STU Universities of Casablanca and El Jadida in order to do practical work on geophysical equipment including.

Observatory IFRANE:

This is one of the most active observatories of the Scientific Institute, first by his situation in the Middle Atlas and also at the center of the city of Ifrane which has a strategic position. The observatory has an area of approximately 7 hectares is dedicated mainly to studies of seismology, although in its infancy (in the 1920s) the cimatologie was paramount.

- **Climatology :**

Indeed, the first scientific observations, mainly climatological observatory began to Ifrane in the twenties. He was considered an auxiliary dynamic meteorology station (station auxiliary first order), these observations were for measures and records air pressure, direction and wind strength, temperature, cloud cover and visibility, precipitation, sunshine, etc.. These measures will continue in their part meteorology until the mid-eighties, before the National Directorate of Meteorology is created in Casablanca (1965).

- **Seismology :**

After the destructive earthquake of Agadir (1960) was the precursor of decision makers and therefore the need to create a seismic network has proven to be important and urgent. But it was only from 31 October 1964 that a three-component station coupled electromagnetic seismo-galvanized, short period, type APX, began recording at the observatory of Ifrane. The recordings were made on photographic paper.
From June 2005, a digital station, briefly, like Hathor three, three-component, was installed in Ifrane in addition to the analog station type MEQ 800, while a second seismic station broadband-like (After the Averroes) is now installed at the observatory of Ifrane (IFR). The latter is connected via the Internet at the Scientific Institute in Rabat and transmits in real time.

- **GPS**

In 2009, the GPS belonging to MIT (USA) is transferred from the premises of the University Observatory Al Akhaouayne in Ifrane. It is managed jointly by the Scientific Institute, MIT and EMI (Rabat).

Observatory TIOUINE:

- **Seismology**

The observatory Tiouine was established in 1971 with the installation of a seismograph with a seismometer vertical natural period of 1 second (Willmore Mk II) and ink recording. It was installed in the gallery of an old abandoned mine manganese, but the site is ideal for seismic recordings. Since a di-Zaine years, he was replaced by a station-type MEQ 800.
Given its distance from the grid, the observatory is supplied with electricity by solar panels and a generator.
In 2008 through the close collaboration with ROA (Cadiz) and UCM (Madrid), a VBB seismic station (next generation) was installed at Tiouine. A GPS station was installed in 2008

- **Magnetism :**

Station magnetic Tiouine was created after finding that the transient variations of Z are abnormally high at the Observatory Averroes. Although this situation is not peculiar to Averroes, since it is found in observatories located in the neigh-bourhood of the oceans. This is one of the reasons that led him to create this ob-servatory magnetic situated more than 230 km as the crow flies from the Atlantic Ocean. These recordings will definitely stop by lack of financial resources and the difficulty of finding the recording paper on the market, most observatories are already switched to digital recording.

Observatory AOUINET TORKOZ:

THE RESEARCH STATION presaharic AOUINET TORKOZ

Research Station of presaharic Aouinet Torkoz, former station Indigenous Affairs, consists of a main building and a well-maintained courtyard, surrounded by homes and goumiers of defensive fortifications in ruins the whole thing can cover third of a hectare.
Jean Bertrand Panouse, former director of the Scientific Institute Chérifien, is the founder of the Research Station of presaharic Aouinet Torkoz. He directs the work officially in 1956.
Henri Hollard (geologist) has stayed many times in this station because of the significant geological mapping has established that (almost the only one today) and is the basis of all research in the Anti Atlas.
Tours of the station were not limited only to geologists, biologists, botanists, entomologists, ... of all nationalities: French, Spanish, English, Austrian, American, ... will enjoy the peace and comfort of the resort but also the ri-richness of the region by its fauna and flora.

After a period of "calm" that will extend over two and a half decades (1975-2000), the research station will undergo a re-new science that will start with shipments of geologists that could bring the return of Subcommittee on Devonian Stratigraphy which held some of its seats to Aouinet Torkoz in March 2004 and in May 2004 as a national research meeting on the occasion of the inauguration of new premises by the Governor of the Province of Assa-Zag and Scientific Director of the Institute, together with a group of researchers from Rabat and France for the occasion.
The Scientific Institute intends to develop the medium term a regional museum, documentation center and organize scientific research trips for the promotion of science in this region.

- **Seismology :**

Station Aouinet Torkoz is located in a region that is far from any industrial or agitation ocean. Its position south of the current network is strategic to record seismic activity in this part of Morocco and improve the accuracy of the locations of earthquakes.
The year 1991 saw the installation of the first seismic station in Aouinet Torkoz, but for logistical reasons such as lack of electricity, and distance from the central station of Assa (50 km of track) station Seismological had to stop recording after only three years of commissioning.
In 2009, and as part of a scientific cooperation with the Higher Technical Institute of Lisbon, a new seismic station type very broadband (VBB) was installed at Aouinet Torkoz. A GPS station was also installed through close collaboration with the Scientific Institute Aspen Munich (Germany). The two stations are connected to the Internet via VSAT and broadcast in real time to the SI and the Portuguese and German partners.