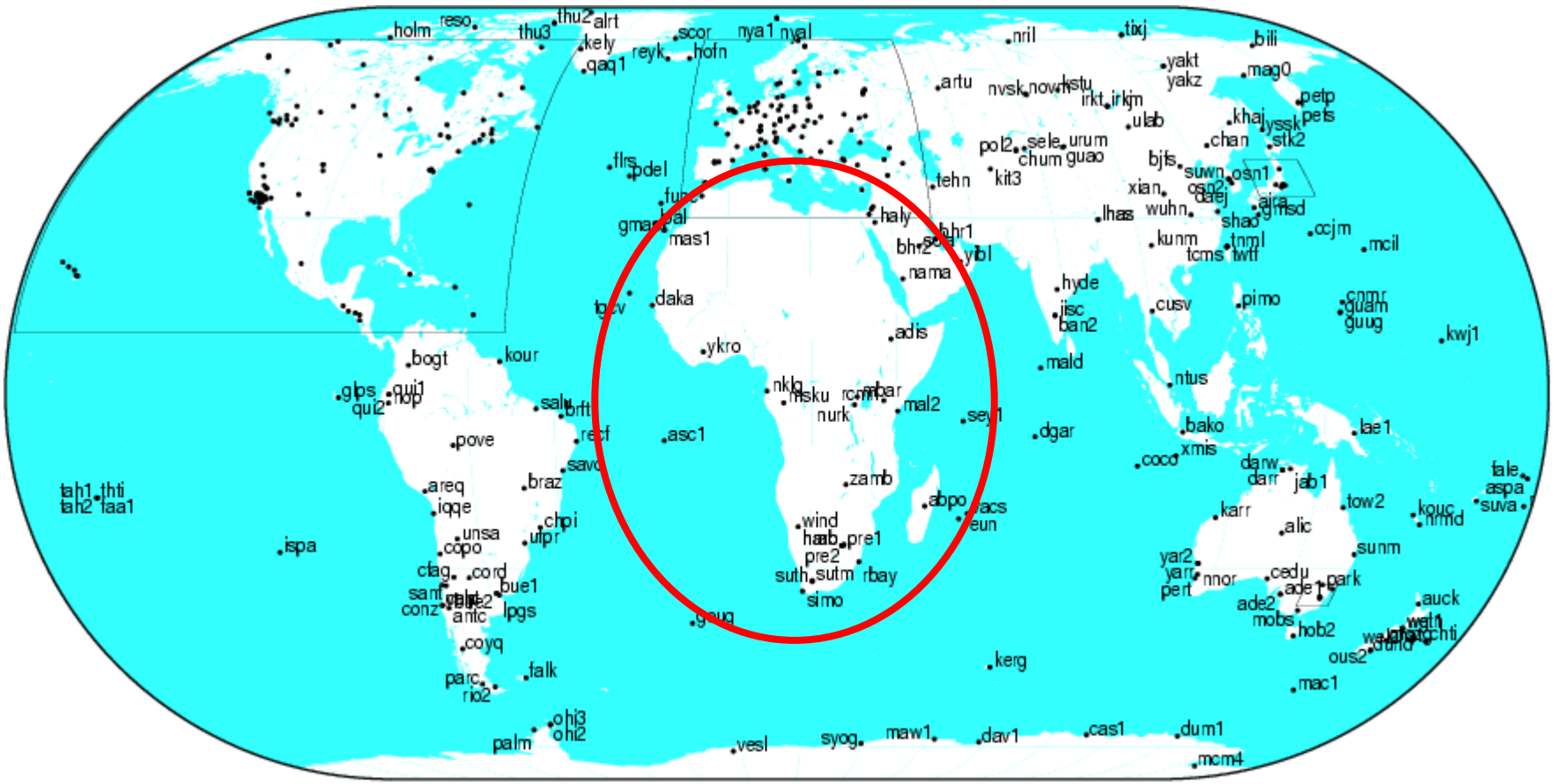
Achievements in Equatorial Aeronomy in Africa

Roger Smith, Geophysical Institute, UAF

Jonathon Makela, University of Illinois at Urbana-Champaign

Endawoke Yizengaw, University of California Los Angeles

IGS network -> World



GMT 2009 May 24 16:46:21

IGS network - > free on the web http://www.unavco.org/

Africa ~ 20 permanent sites

Click

- data

- permanent stations

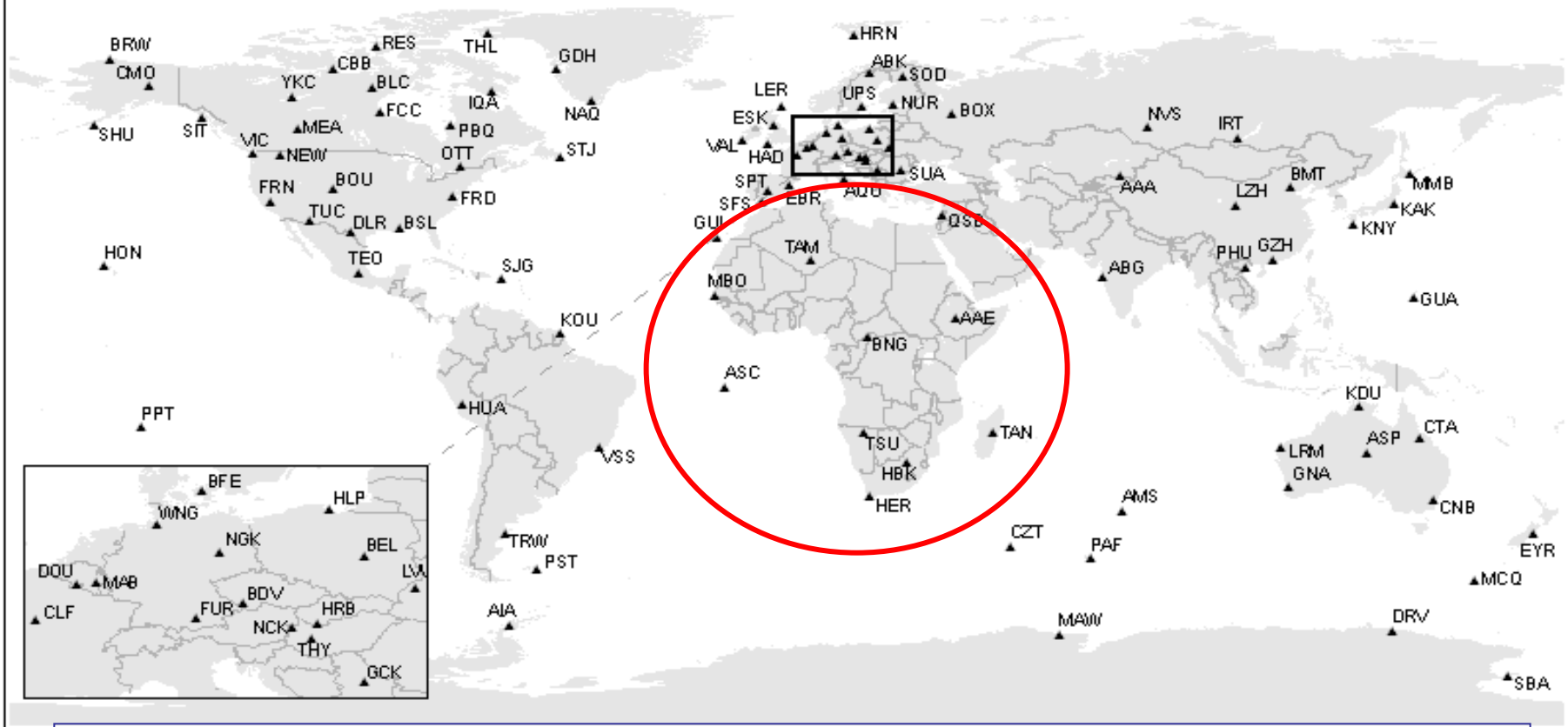
- Africa

WORLD

INTERMAGNET
Since year 1991
CD-ROM

http://www.intermagnet.bgs.ac.uk

AFRICA : 9 permanent observatories



The data consist of one-minute, hourly and daily mean values for the vector Component X,Y,Z or D,H,Z
The intermagnet CD-ROM/DVDs are available at no charge for academic purposes

Current Instrument Arrays (Feb 2009)

IHY

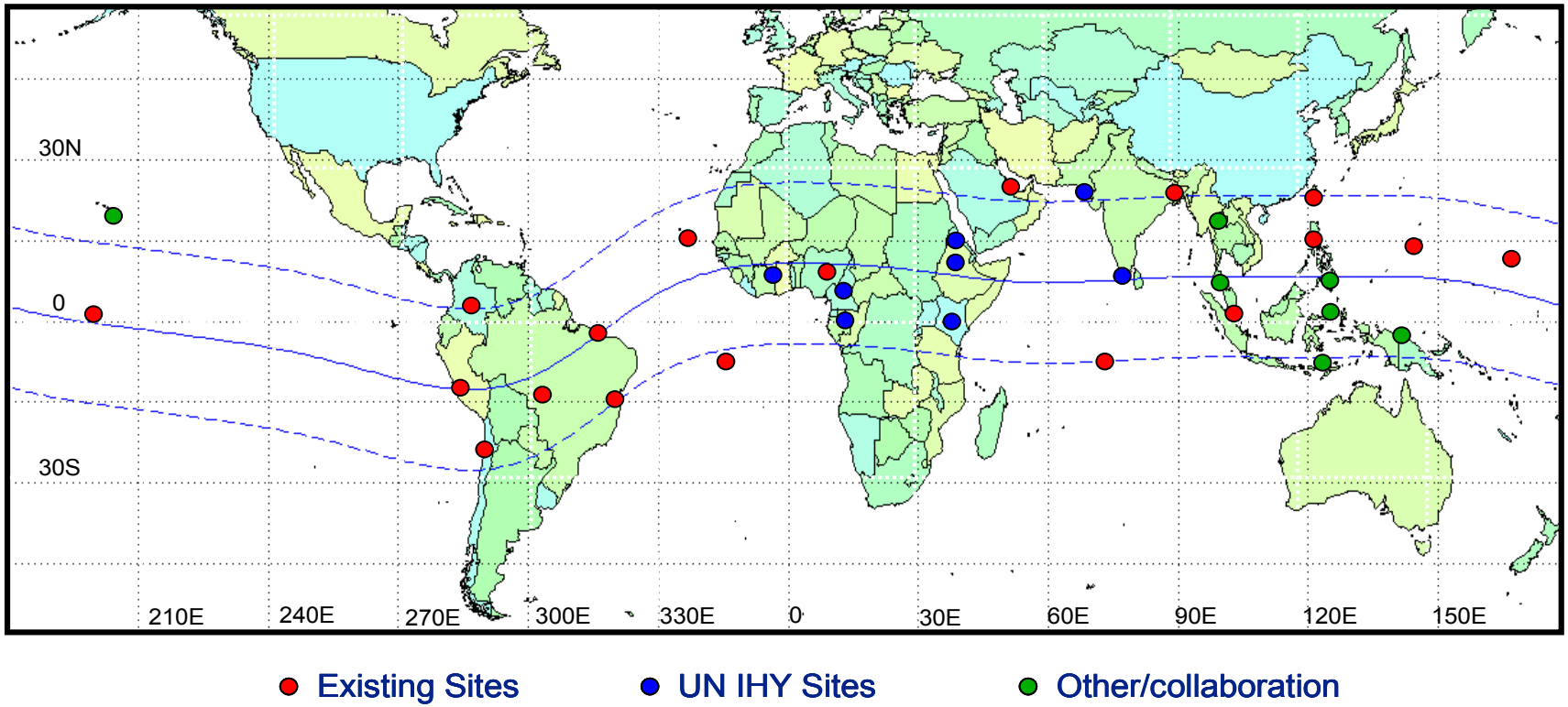
ID	INSTRUMENT	Lead Scientist	Country	Objective
1	Scintillation Network Decision Aid (SCINDA)	K. Groves keith.groves@hanscom.af.mil (Hanscom AFRL)	USA	Study equatorial ionospheric disturbances to aid in the specification and prediction of communications degradation due to ionospheric scintillation in the Earth's equatorial region
2	Coherent Ionospheric Doppler Radar (CIDR)	T. Garner garner@arlut.utexas.edu (U Texas)	USA	To tomographically reconstruct the ionosphere and to provide input to data assimilation models
3	Atmospheric Weather Education System for Observation and Modeling of Effects (AWESOME) and Sudden Ionospheric Disturbance monitor (SID)	U. Inan inan@stanford.edu D. Scherrer deborah@solar2.stanford.edu (U Stanford)	USA	Lightning, sprites, elves, relation to terrestrial gamma ray flashes, whistler induced electron precipitation, conjugate studies
4	Remote Equatorial Nighttime Observatory for Ionospheric Regions (RENOIR)	J. Makela jmakela@illinois.edu (U Illinois)	USA	Study the equatorial/low-latitude ionosphere/thermosphere system, its response to storms, and the irregularities that can be present on a daily basis
5	African GPS Receivers for Equatorial Electrodynamics Studies (AGREES)	E. Yizengaw ekassie@igpp.ucla.edu M. Moldwin (UCLA)	USA	Understand unique structures in equatorial ionosphere, low/mid latitude plasma production, effect of ionospheric and plasmaspheric irregularities on communications
6	African Meridian B-field Education and Research (AMBER)	M. Moldwin mmoldwin@igpp.ucla.edu E. Yizengaw (UCLA)	USA	Understand low latitude electrodynamics, ULF pulsations, effect of Pc5 ULF on MeV electron population in inner radiation belts

IHY GPS NETWORKS

SCINDA -> Scintillation Network Decision Aid

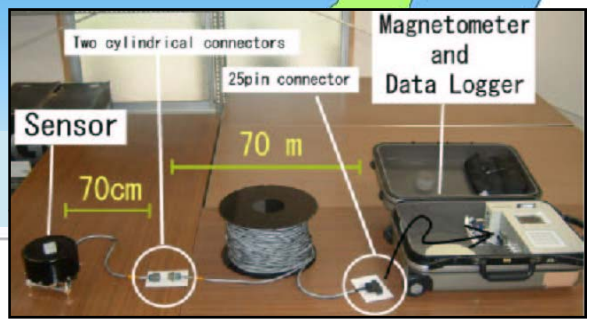
www.fas.org/spp/military/program/nssrm/initiatives/scinda.htm

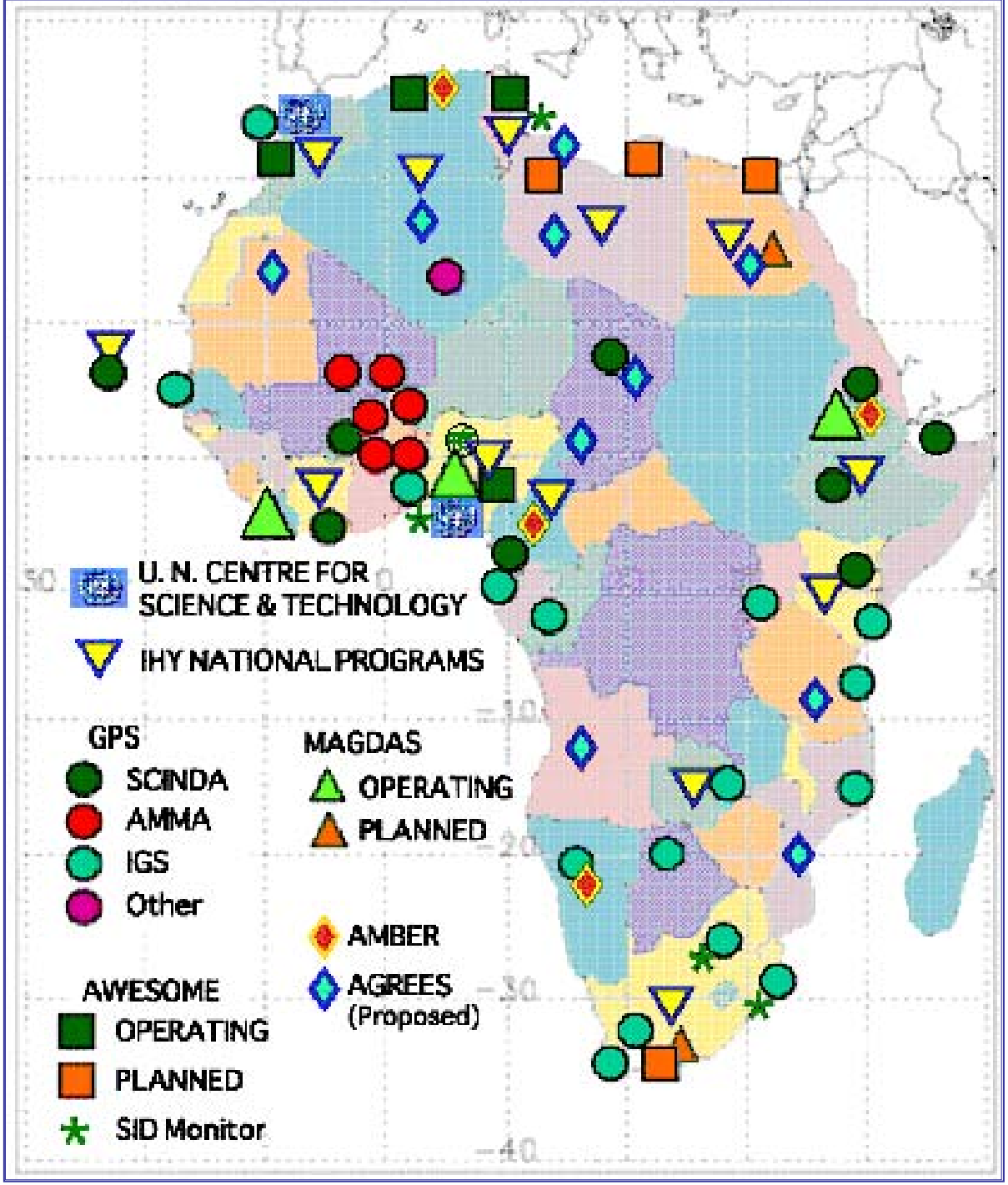
Keith GROVES -> e.mail : Keith.Groves@hanscom.af.mil



MAGDAS (MAGnetic Data Acquisition System) Network at SERC, Kyushu Univ.

PI: Prof. K. Yumoto




U. N. CENTRE FOR
SCIENCE & TECHNOLOGY
IHY NATIONAL PROGRAMS
GPS
SCINDA
AMMA
IGS
Other
MAGDAS
OPERATING
PLANNED
AMBER
AGREES
(Proposed)
AWESOME
OPERATING
PLANNED
SID Monitor

Jonathon Makela will continue…..

IHY Pedigree

Program	Start	Years After
1st International Polar Year	1882	
2nd International Polar Year	1932	50
International Geophysical Year	1957	25
International Quiet Sun Year	1964	7
International M'spheric Study	1976	12
Solar-Terr. Energy Program	1990	14
International Heliospheric Year	2007	17

What IPY, IGY, etc. Programs Do

IPY 1 **Map the phenomena**

IHY

CDF for comparative studies

Web accessible data for comparative studies

CDAWs for comparative studies

IHY Hubble proposal for comparative planetary auroras

and processes; Emerging nations

IHY

ID	INSTRUMENT	Lead Scientist	Country	Objective
7	Compound Astronomical Low-cost Low-frequency Instrument for Spectroscopy and Transportable Observatory (CALLISTO)	A.Benz benz@astro.phys.ethz.ch C. Monstein monstein@astro.phys.ethz.ch (ETH-Zentrum)	Switzerland	Study the magnetic activity of a wide range of astrophysical objects with emphasis on the Sun and cool stars
8	South Atlantic Very Low frequency Network (SAVNET)	J.-P. Raulin raulin@craam.mackenzie.br (U Presbiteriana)	Brazil	Study of the SAMA region at low ionospheric altitudes and its structure and dynamics during geomagnetic perturbations
9	Magnetic Data Acquisition System (MAGDAS)	K. Yumoto yumoto@serc.kyushu-u.ac (Kyushu U)	Japan	Study of dynamics of geospace plasma changes during magnetic storms and auroral substorms, the electromagnetic response of iono-magnetosphere to various solar wind changes, and the penetration and propagation mechanisms of DP2-ULF range disturbances
10	African Dual Frequency GPS Network	C. Amory-Mazaudier christine.amory@lpp.polytechnique.fr (CETP/CNRS)	France	To increase the number of real-time dual-frequency GPS stations worldwide for the study of ionospheric variability, response of the ionospheric total electron content (TEC) during geomagnetic storms over the African sector

IHY

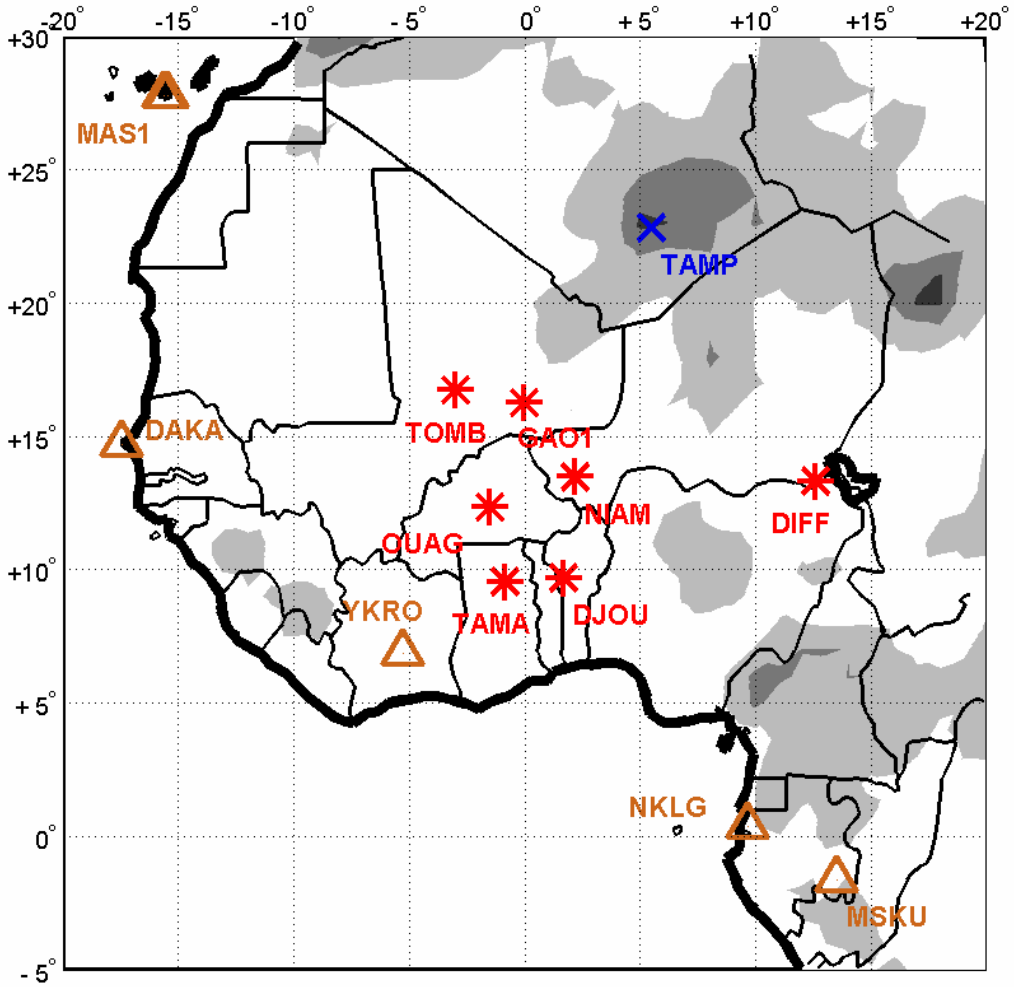
11	Space Environmental Viewing and Analysis Network (SEVAN)	A.Chillingarian chili@aragats.am (Aragats)	Armenia	A network of particle detectors that aims to improve fundamental research of the particle acceleration in the vicinity of the Sun and the space environment, as well as to provide forewarnings of dangerous consequences of space storms
12	Global Muon Detector Network (GMDN)	K. Munakata kmuna00@gipac.shinshu-u.ac.jp (Shinsu U)	Japan	To identify the precursory decrease of cosmic ray intensity that takes place more than one day prior to the Earth-arrival of shock driven by an interplanetary coronal mass ejection
13	Continuous H-alpha Imaging Network (CHAIN)	S. UeNo ueno@kwasan.kyoto-u.ac.jp K. Shibata (Kyoto U)	Japan	Solar activity, flares, filaments, filament eruptions
14	Optical Mesosphere Thermosphere Imager (OMTI)	K. Shikawa (Nagoya U)	Japan	Dynamics of the upper atmosphere through nocturnal airglow emissions

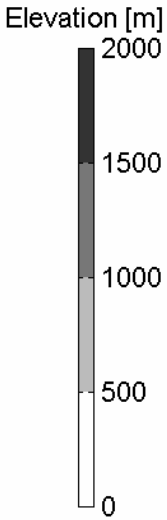
AMMA network -> Olivier BOCK

Niamey, Djougou, Gao since June 2005
Tamale Tombouctou since April 2006
Ougadougou since June 2006

Tamanrasset -> protocole with the CRAAG

All the AMMA data
-> IGS in 2 years
free for everybody





Contact
Olivier.Bock@aero.jussieu.fr

http://www.amma-international.org