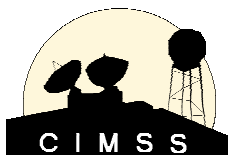


SSEC/CIMSS effort in establishing international collaboration with developing countries for remote sensing training and research

Presented by Paolo Antonelli
CIMSS/SSEC/UW-Madison

17th International SeaSpace Remote Sensing
October 7-9, 2007



Outline

- Introduction
- Teaching
 - The Remote Sensing Seminars;
 - The IMAPP training schools;
 - The Benevento School;
- Research and Collaborations
 - Collaboration with the University of Bahir Dar, Ethiopia;
- Conclusions and Issues

The point

- Environmental awareness is spreading out is getting linked more and more to aspects of everyday life;
- Environmental problems are now recognized as possible causes of conflicts:
There is little hope of peace in war-ravaged Sudan unless it addresses widespread environmental damage and climate change, a UN study has found
(from BBC <http://news.bbc.co.uk/2/hi/africa/6230616.stm>)
- The EOS program has opened the door to accessible direct acquisition of environmental satellite data potentially to anyone in the World;
- Software has been developed and distributed to the public to generate products for environmental monitoring;
- As the environmental issues become more and more relevant to decision makers, demand for international training and cooperation in remote sensing keeps increasing, especially in countries lacking strong scientific programs;
- CIMSS/SSEC effort in outreach, training and international collaboration is constantly growing. The point is how is the goal of this effort

People involved in this effort

Instructors

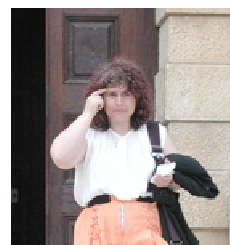


Missing
pictures of:
Vincenzo
Levizzani
Maria Vasys
Maciek Smuga-
Otto

Tutors



Hosts



Promoting the concept of collaboration for new generation of Remote Sensing Scientists

- SSEC has a long tradition of excellence in outreach and educational related activities;
- In the last six years SSEC has heavily invested international courses (hereafter REMOTE SENSING SEMINARS) on remote sensing which emphasize collaboration;
- 18 courses were offered in the last 6 years in 11 different countries (Italy, China, South Africa, Norway, Poland, U.S., Australia, Russia, India, Costa Rica, Ethiopia)

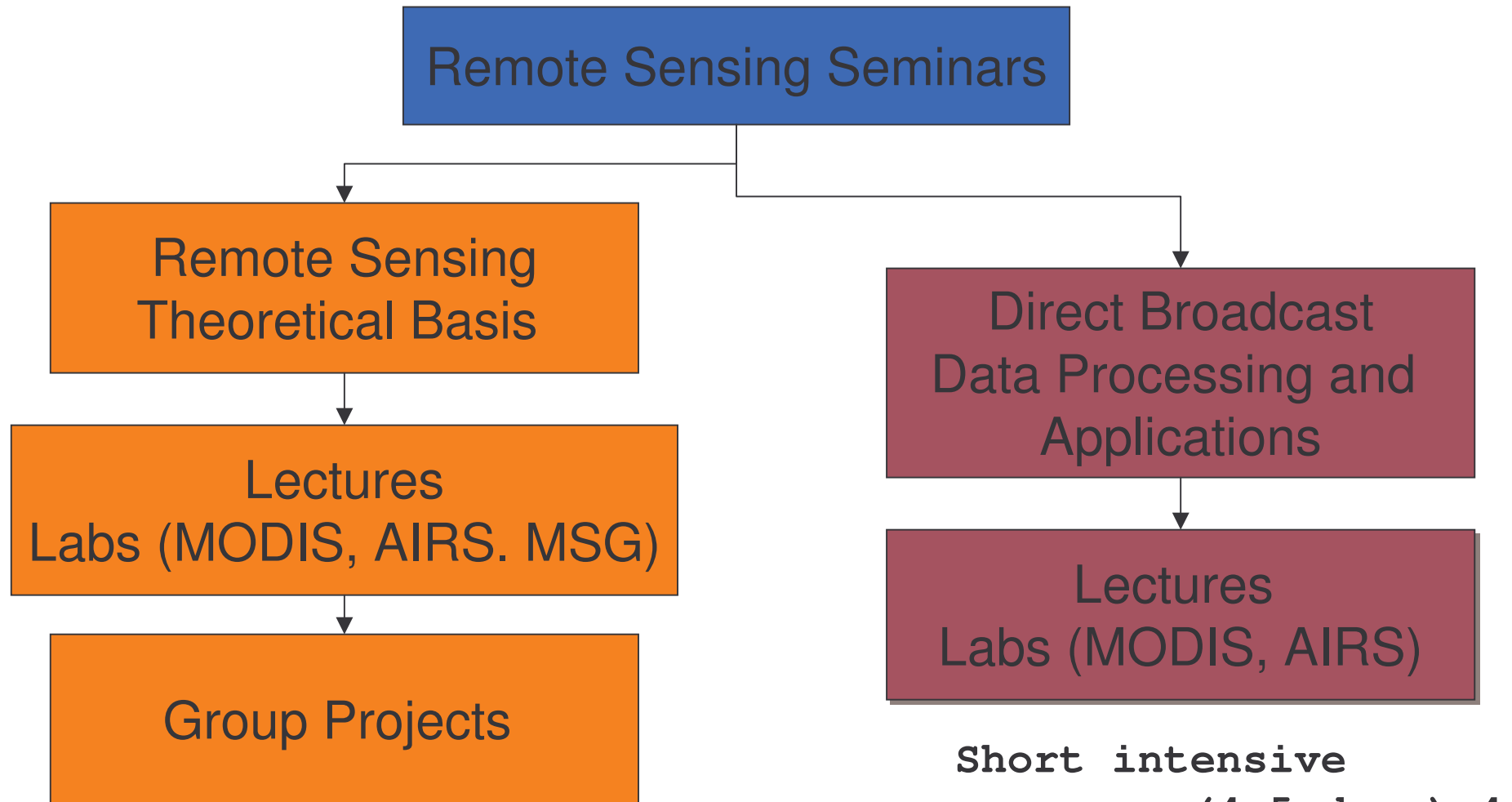
RSS History

- Summary of 6 years of international training activities

RSS History

- The Remote Sensing Seminars started with an initiative of Prof. P. Menzel in 2001, but their roots go well further back in SSEC tradition;
- The idea was to make knowledge, educational material, data, and software, freely available to international students;
- Since then the seminars developed into an itinerant school;
- L. Gumley and A. Huang initiated a new branch of the seminars more focused on operational aspects, but using the same approach and philosophy adopted by P. Menzel.
- In the last five years courses have been offered on demand, at a constantly increasing rate, all over the World;

Organization



Longer courses (6–10 days),
2 teachers, 3 tutors selected
among previous courses participants

Short intensive
courses, (4–5 days) 4
to 5 teachers

Key Features

- On average 10 participants per teacher (**sizeable**);
- Courses are tailored according to the needs of the hosting institutes and of the participants (**focused**);
- Locations are carefully selected to avoid, when possible, large cities and to privilege small, isolated facilities;
- Teachers and participants whenever possible share the same accommodations and most of the free time;
- Along with training of participants, there is a gradual effort in time to turn some of the students into tutors, and some of the tutors into teachers: training future trainers (**invest in quality**);

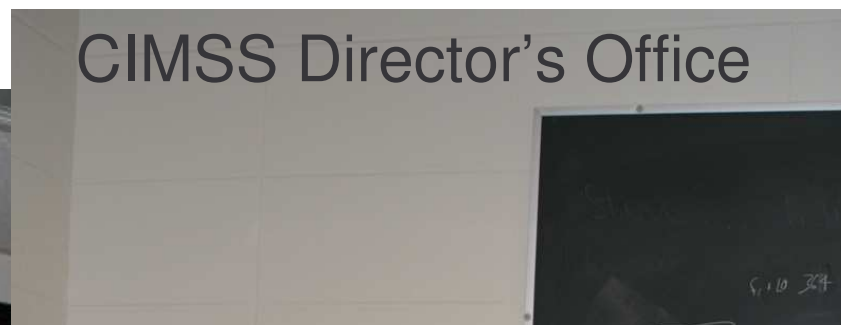
Direct Results in Numbers

- 18 courses were offered since 2001, and more are on the way;
- More than 450 participants from about 31 countries (126 participants only in Italy, that is a consistent share of the next generation of Italian remote sensing scientists);
- 10 participants out of 5 seminars, became tutors and 2 of them lecturers;
- 7 former participants visited SSEC for short or long term collaborations;

Indirect Results

- Promoting communications
 - 2500 e-mail exchanged between Italian participants in 5 years (1225 only among the Maratea participants)
- Having an impact on the next generation of Italian remote sensing scientists by providing connecting opportunities
 - In this meeting 6 out of 10 contributions (oral presentations and posters) from Italian scientists are provided by people who participated to or organized at least one of the RSS
- Teacher Pride
 - The SSEC director, the CIMSS director and former director proudly have RSS posters and pictures signed by participants hanging in their offices

Teacher Pride



Financial support

- SSEC is currently supporting 5 to 6 seminars per year:
 - On average 3 scientists per seminar per 7 days on site and about 14 days of preparation (salaries are generally covered by outreach component of grants at SSEC);
 - Travel expenses are usually (but not always) paid by international hosting institutes;
 - Teachers (scientists) do not receive any extra compensation and some time volunteer their own vacation time;
- Participants generally paid for their costs (except for Krakow 2006, South Africa 2006 and Benvento 2007);
- Financial Support was provided in different occasions by EUMETSAT.

Sustainability

- In order to sustain and improve this effort we are in the process of:
 - Looking for opportunities to fully support the training activities in a stable way;
 - Creating stable *Center(s) for Training in Environmental Remote Sensing*;
 - Targeting more efficiently students and researchers from developing countries;

Benevento 2007

- 3-13 June 2007

Agenda

- APPLICATIONS WITH THE NEWEST MULTI-SPECTRAL ENVIRONMENTAL SATELLITES
- **Su pm** *Welcome* Discussion of Agenda
- **Mo am** *Lecture 1* Planck Function, Radiation **Mo pm** *Lab 1* Lab on Planck Function
- **Tu am** *Lecture 2* Radiative Transfer in the Earth Atmosphere, Homework 1 **Tu pm** *Lab 2* Intro to Hydra (Europe Data Set)
- **We am** *Lecture 3* Spectral signatures from Earth's surface and atmosphere **We pm** *Lab 3* Interrogating MODIS Data
- **Th am** *Lecture 4* Dealing with imperfect data, Signal gathering with a remote sensing instrument **Th pm** *Lab 4* Signal Processing Lab
- ~~Fr am~~ *Lecture 5* Land, Ocean, and Atmosphere Investigations with MODIS, Quiz, Homework 2 **Fr pm** *Lab 5* MODIS and SEVIRI looking at
- **Sa am** *Lecture 6* Geostationary Perspective **Sa pm** *Lab catch up* Finish Lab
- **Mo am** *Lecture 7* Hyperspectral resolution (e.g. AIRS) **Mo pm** *Lab 6* Exploring AIRS/IASI data
- **Tu am** *Lecture 8* AIRS remote sensing properties, *Homework* **Tu pm** *Lab 7* Continuing AIRS/IASI Lab
- **We am*** *Lecture 9* Summary, Quiz, Homework 3 **We pm*** *Lab 8* Student Presentations of SEVIRI, MODIS, IASI, AIRS Investigations
- *Conclusion, Summary Concluding Ceremony*
- AM sessions: 10:00 am – 12:30 pm – PM sessions: 2:30 pm – 5:00 pm

The course in numbers

- First time the two training courses Remote Sensing Theoretical Basis and Direct Broadcast Data Processing and Applications were combined in a 10 day school;

28 students from 12 countries (Egypt, Senegal, Kenya, Iraq, Gaza, Sudan, Burkina Faso, Italy, Ecuador, Turkey, Bulgaria, Hungary, Mauritania);

5 lecturers and 2 tutors;

21 full scholarships were awarded;

Financial support was received from Provincia di Benevento (40K Euro), Eumetsat (15K Euro), and from CIMSS/SSEC (20K Dollars).

The course in flash and bones...



Feedback: What in the course was really useful to you?

- All the things I learned in Benevento are useful for me, but especially important for me was the fact that once more I rediscovered that the working the field of meteorology give me such pleasure that i can not get for many other work. this may seem strange to you but, because of the very low salaries in the universities in Bulgaria I had started to gave up on my science work and looking for other jobs. now behind working part time in a wind energy development company I am very determined and working on my PhD and trying to find a research position somewhere in Europe where I would be able to concentrate on my research. In short in Benevento I realized that for me is more important to work in the field of meteorology than to live in my own country. Behind this learning how to work with hydra anddiagnose different atmospheric and ground features and processes fromsatellite images will be very useful in my future work.I guess I do not need to mention that the contact with you and the other people I met in Benevento made me a very rich man!!! the beautiful communication between so many people from different countries, cultures and religions was something amazing

Feedback: Did you get to use some of the material handed out during the course for your work or for teaching?

- first: I will introduce many applications about clouds detection in the thermodynamics seminar (part of the meteorology course (for Physicists) in the 2008 winter term at La Sapienza University), I'm writing down the new program.
- second: I've been working on the extraction a decent summer SST around the Mediterranean Sea to use in ocean model simulations, I work with SEADas stuff, feel guilty ...
- finally, while I was working on SST (being a bit bored, actually) I took a look at the fires which unfortunately have spread in the southern Italy in July-August. I proposed a short comment (worked out with Hydra, of course) about satellite forest fire detection on the internet APAT site and, since on August the www guys are really short of news, they published it. Giuseppe was really sweet and helpful, of course. here it is:
<http://www.apat.gov.it/site/it-IT/default.html>

Other Feedback

- Dear all Friends,
at the end of story, I have arrived to Gaza after waiting in Egypt near the border for 38 days. I suffered a lot in Egypt. I think some people couldn't believe me that is unbelievable for him/ her because all people all around the world move easily from place country to other. I think, I should think million times before to decide to go outside Gaza Strip that is the biggest prison in the world. The situation in Gaza became worst more than before to go to Italy. The situation in Gaza is too difficult and I am as Palestinian that I couldn't understand the complicated political issues.
Please don't mind, this is my problems and sorry if I disturbed you. I talked you because I feel you are very good friends. Really I was very happy with you and I would like to meet you all. Unfortunately the course didn't continue for along time.

Other Feedback

- Dear Mr. Paolo ;

Hi Mr. paolo How are u I miss u very much.

I would like to thank you for your great hospitality , I felt happy in being with you and sad for leaving you , I felt as if I was home ; wishing you all the best .I have reached Iraq after a great suffer from the journey , the moment I reached gun fire started and I was in the middle of the fire ,but God saved me from death , when I came home I found my house ruined because of a bomb near my house. I hope that if you can help me in a way so that I can go and stay in Italy with my family because the situation in Iraq is unbearable. I hope that I'm not troubling you with my request.

Considerations on Benevento RSS

- First attempt of merging theoretical and practical training courses;
- the amount of material pushed the students to their limits and at some point could not be properly assimilated;
- 28 students came out of the course as a group;
- The school was brought to the attention of the Italian Minister for Environmental Protection who came to meet with the students;
- organization was quite problematic, however we succeeded in bringing a very heterogeneous group in an *fairly isolated* village in Italy;
- Questions were raised from the teaching staff about the benefits of the school to the students: did we achieve our goals?
- Merging the two school brought up the need for clarification of the training purposes: what are our goals? What should be our target audience?



International Collaboration with Ethiopia

- Part of SSEC/CIMSS effort in collaborating with developing countries to establish new capacities.

Collaboration with University of Bahir Dar

- Collaboration with University of Bahir Dar: one month visit with two goals:
 - Write a proposal to be submitted to the European Community under the call for the 7th Framework Program (cooperation call);
 - Deliver the lectures and the material provided at the Remote Sensing Seminar in Benevento in June 2007.

University of Bahir Dar, Ethiopia

- one of the biggest universities in Federal Democratic Republic ETHIOPIA, which has more than 20 thousand students and more than 400 lecturers;
- Bahir Dar University was inaugurated in May 2001 (1992 E.C.) when Bahir Dar Teachers College and Bahir Dar Polytechnic Institute joined together to become the Education and Engineering Faculties, respectively, of the new University;□
- The two faculties provide degree-level teaching and expertise in Education and Engineering for the Country;
- The University has recently added two faculties, the Faculty of Business and Economics, and the Faculty of Law with courses in subjects including Accounting, Economics, Business Management, Law and Ethics.□In addition, the

Proposal

- The Proposal aims to establish the capacity for environmental satellite data processing in Ethiopia;
- We agreed on a partnerships with the University of Freiberg (Germany) and the Italian Civil Protection;
- UW should be subcontracted by the one of the European partners;
- The proposals focuses mostly on training and adaptation of existing global algorithms to regional situations;
- Budget is still under evaluation but it has been estimated within 1.2M-1.5M Euro over five years.

Multinational Collaborative Remote Sensing Research and Education (McRRE)

- The two main objectives of McRRE are:
- to promote and facilitate the use of satellite data to monitor environmental climatological changes;
- to promote the concept of collaborative research between remote sensing scientists of countries with different capacities.
- This is possible by integrating research, development and education. McRRE is a 5 year program which aims to create the capacity for real time environmental satellite data processing in Ethiopia, the capacity for professional training of international students at the Mediterranean Agency for Remote Sensing and environmental control and the Department of Civil Protection in Italy, and the capacity at the Universities of Freberg - Germany and of Wisconsin - Madison, of enabling countries new to the area of remote sensing to acquire and process real time data

Goals

- Goal is to use data obtained from NASA Terra and Aqua satellites, European Metop, and Cosmo Skymed satellites to:
- Establish capacity for real time environmental satellite data processing in Ethiopia;
- train for Ethiopian scientists to prepare the next generation of remote sensing students for satellite data use in Ethiopia and international collaborative research;
- enable countries relatively new to the area of remote sensing to acquire and process real time data with locally optimized algorithms tailored to local needs;
- increase level of knowledge of the environmental changes in Central Africa relevant to the understanding of global climate changes.

Climate and environmental research and development

- Proposed research activities aim to create the following systems:
- drought and flood monitoring;
- vegetation change monitoring;
- lake Tana, and Blue Nile river monitoring;
- localized climate monitoring.

Bahir Dar University



The End

- Thank you