Atmospheric Remote Sensing and Climate System (ARSCliSys) Research Group

An Overview

by
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ARSCliSys part of IGAM evaluation presentation, November 12, 2002; gki/IGAM, Oct. 30, 2002.

ARSCliSys Research Group @ IGAM/UniGraz
outline

- the research team
- general scientific aims
- current research programme lines
- initialized future programme lines (plus 2 examples)
- more information

ARS CliSys Research Group

Atmospheric Remote Sensing and Climate System — ARS CliSys — on the art of understanding the climate system

(founded 1996, status October 2002)

Marc Schwärz

Andrea Steiner

Sabine Tschürtz

Gottfried Kirchengast

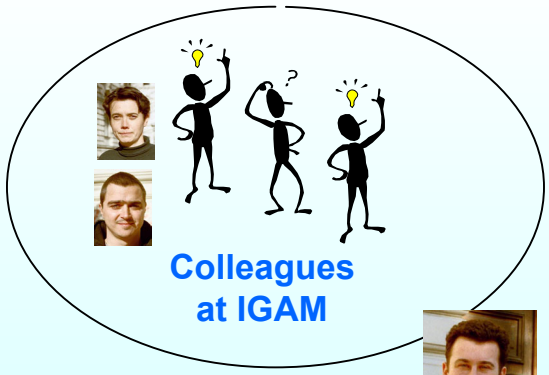
Christoph Bichler

Ulrich Foelsche

Johannes Fritzer

Members (at IGAM)

- Head
- 2 Senior Scientists
- 2 Post-Doc Scientists
- 5 Ph.D. Students
- 1 M.Sc. Student
- 1 Admin. Assistant



Colleagues at IGAM

Colleagues Worldwide

Christian Retscher

Christoph Rehrl

Josef Ramsauer

Armin Löscher

Andreas Gobiet

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general scientific aims

- **Improved monitoring of climatic changes, both due to natural and anthropogenic influences, in the atmosphere's thermal, moisture, ozone, and geopotential height structure**
  - Occultation sounding and advanced IR sounding for climate change monitoring (climatologies & analyses) in *T*, *Z*, *q*, O_3
  - Use of the sounding data for atmospheric trend and variability studies (seasonal to decadal scales)
- **Exploitation of climatologies&analyses expected to be climate evolution monitors of unprecedented climatological quality**
  - Assessment of potential improvements to climate model physics (e.g., in radiation, humidity, and cloud modeling) and forcings (e.g., on volcanic and solar forcing)
  - Preparation of climate change detection & attribution schemes using the novel datasets as rigorous observational constraints

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current research programme lines

- ***START-ATCHANGE* Programme:**
  - **Advanced Spaceborne Sounding and Climate Modeling for Atmospheric Change Analysis**
    - timeframe 1999–2004, budget ~1.1 MEUR (source FWF/BMBWK)
- ***ENVI-ATCHANGE* Programme:**
  - **Atmospheric Change Analysis based on Spaceborne *T*, *q*, O_3 Sounding Involving GOMOS, MIPAS and GNSS Limb Sensors**
    - timeframe 2001–2005, budget ~0.5 MEUR (source ASA/BMVIT)
- ***ESA-R&D* Programme:**
  - **End-to-end Occultation System Performance Simulation and Advancement of Data Processing Methodology & Algorithms**
    - timeframe ≥1996, budget ~0.6 MEUR/5yrs (source ESTEC/ESA)

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initialized future programme lines

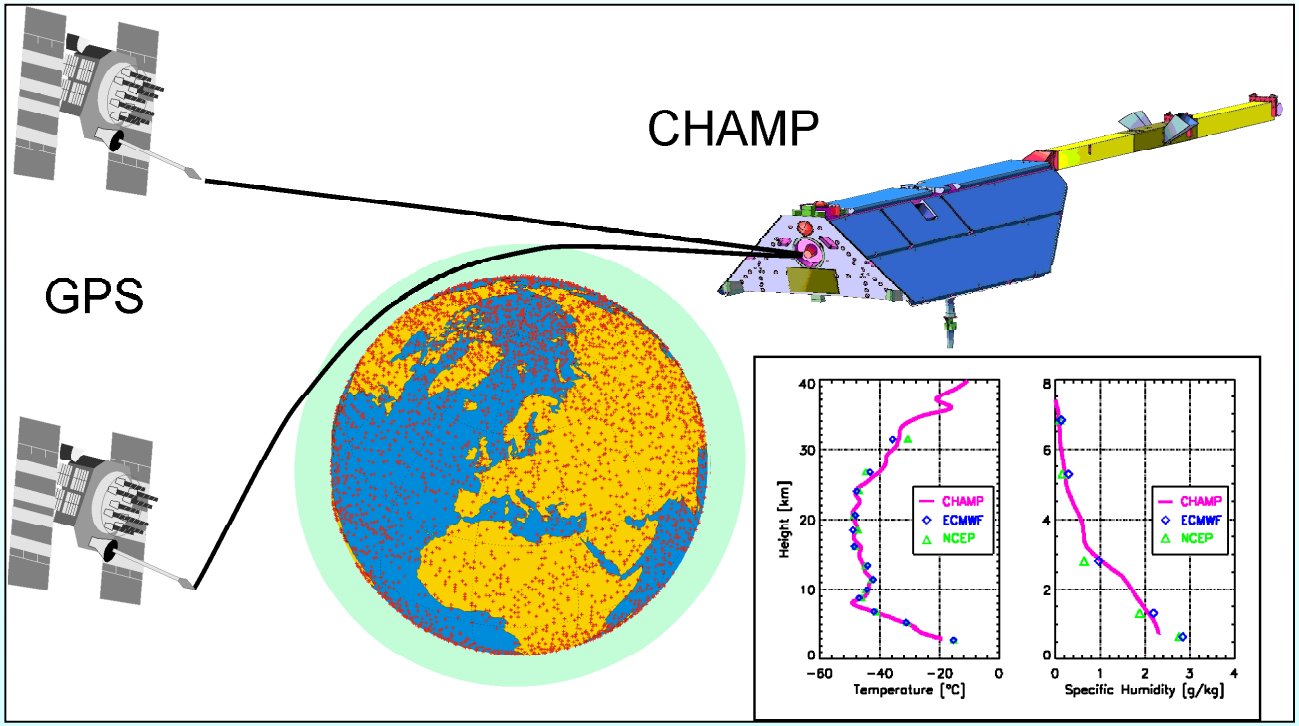
- ***ECCMAR Programme:***
  - **European Center for Climate Monitoring, Analysis, and Research – research and user services on key global climate datasets**
    - timeframe ≥2002, IGAM budget ≥2004: *tbc* MEUR/yr (EU&EUM&Nat.)
  - *Seed Project:* CHAMPCLIM – climate monitoring based on CHAMP/GPS
    - timeframe 2002–2004, budget ~0.3 MEUR (ASA/BMVIT "seed money")

- ***ESA-ACE+ Programme:***
  - **ACE+ – Atmosphere and Climate Explorer based on GPS, GALILEO, and LEO-LEO Radio Occultation (ESA Earth Explorer Opportunity Mission)**
    - timeframe 2002–2012 (launch: 2007/08), mission budget ~115 MEUR, IGAM budget ≥2003: *tbc* MEUR/yr (ESA&EU&Nat.)
  - *Seed Project:* ACEPASS – ACE+ phase A science study (on LEO-LEO)
    - timeframe 2002–2003, budget ~0.25 MEUR (ESA "seed money")

initialized future programme lines (example 1)
ECCMAR Seed Project CHAMPCLIM

CHAMPCLIM – Radio Occultation Data Analysis Advancement and Climate Change Monitoring Based on the CHAMP/GPS Experiment

Main partners: IGAM/University of Graz and Division 1/GFZ Potsdam; cooperation also with: MPIM Hamburg, IAP Moscow, IAP/U.o.Arizona Tucson, SA/CNRS Verrieres-le-Buisson



[Figure prepared by: J. Wickert, GFZ Potsdam, Germany, 2002]

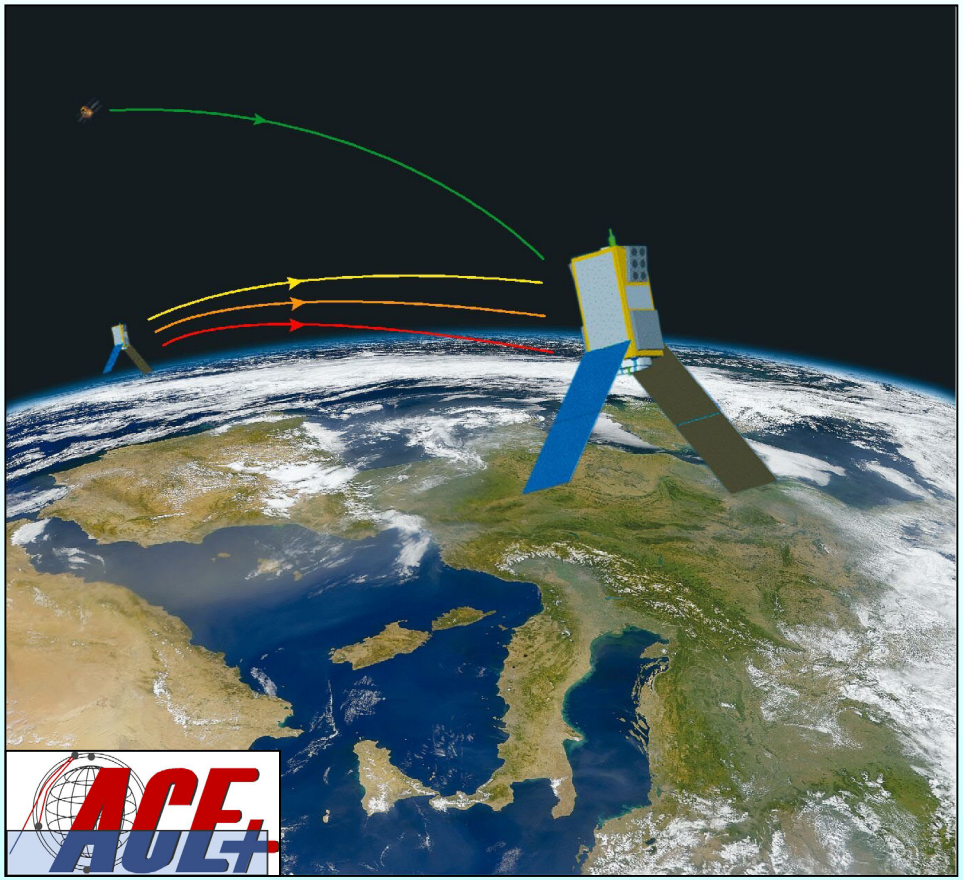
Main Scientific Objectives:

- RO data and algorithms validation based on CHAMP/GPS data
- RO data processing advancements for optimizing the climate utility of the data
- Global RO based climatologies for monitoring climate variability and change

initialized future programme lines (example 2)
ESA Earth Explorer Mission ACE+

ACE+ – Atmosphere and Climate Explorer based on GPS, GALILEO, and LEO-LEO radio occultation

ESA Mission, Science: Lead Investigators P. Hoeg and G. Kirchengast, Mission Advisory Group (appointed by ESA), International Science Team (partners worldwide)



[Image prepared by: Klug/Kirchengast, 2002; raw images: NASA (earth), Alcatel (satellites)]

Basic Facts:

- selected by ESA in May 2002 as top priority future Earth Explorer Opportunity Mission
- 4 LEO satellites exploiting GPS, GALILEO, and LEO-crosslink signals
- ~5000 GNSS-LEO events/day, ~230 LEO-LEO events/day
- phase A 2003, after confirmation early 2004 phases B-D until 2007, operations 2007/08-2012

ARSCliSys Research Group @ IGAM/UniGraz
more information…

more information on the group is available…

- ***personally from the head of the group:***
  - **Prof. Gottfried Kirchengast (IGAM, Room 308)**
    (website: *www.uni-graz.at/gottfried.kirchengast*)

- ***personally from group members:***
  - **see Group Member Details & Contact Information at *www.uni-graz.at/igam-arsclisys > Group Members***

- ***via the internet:***
  - **ARSCliSys Research Group website *www.uni-graz.at/igam-arsclisys***