



European  
Solar Magnetometry  
Network

TMR Network Contract No ERBFMRXCT980190

**Annual Progress Report**

May 1, 1999 — April 30, 2000

**Summary**

The second year of the *European Solar Magnetometry Network* (henceforth ESMN or “the network”) was highly productive. The young visiting researchers are at work and have begun collaboration. The first ESMN school was held (Oslo, June 1999) while the second is on track (Tenerife, November 2000). There are rapid developments at the Canary Island telescopes. Observing campaigns were carried out successfully. SOHO performed well. An ESMN outreach website was started.

**Highlights**

The first ESMN school (UiO, 1–11 June 1999, “Radiative Transfer and Radiation Hydrodynamics”) was a large success, with 17 ESMN members among the 40 participants. Most participants were well below 35 years of age, with a good spread over field of interest, background, nationality, and gender.

ESMN multi-telescope campaigns produced outstanding data. A speckle-restored DOT sunspot movie “scored” the popular *Astronomy Picture of the Day* website (URL [antwrp.gsfc.nasa.gov/apod/ap000223.html](http://antwrp.gsfc.nasa.gov/apod/ap000223.html)). SOHO regularly contributed solar physics “firsts” to the same site (collected at [sohowww.estec.esa.nl/hotshots](http://sohowww.estec.esa.nl/hotshots)).

THEMIS came into full operation during the past year. The rebuilding of the SVST into the New Swedish Solar Telescope (NSST) proceeds at high pace. A plan to rebuild the GCT into a large-aperture telescope (GREGOR) involves ESMN partners.

**Accomplished research**

All of the ESMN objectives were addressed. Most activities followed the projected schedule defined in Section B.3 of the Project Programme, plus some new ones that enhance the ESMN programme:

- Science objectives (magnetic structure topology, magnetic structure dynamics, dynamo

patterning): phenomena of solar activity, in particular sunspot umbrae and penumbrae, have emerged as the central topic in current ESMN studies in keeping with the sun reaching maximum activity this year. An AIP-led multi-telescope campaign<sup>1</sup> concentrated on umbral oscillations. KVA obtained sunspot spectrometry sequences<sup>2</sup> that are being analysed with UiO simulations. UU obtained high-resolution sunspot speckle movies<sup>3</sup> that vividly demonstrate penumbral dynamics. IAC achieved a breakthrough in direct inversion of Stokes and chromospheric polarimetry of umbrae. OP concentrated on inversion of filament data, including running two international filament observation campaigns. At OAC research was carried out on impact ionisation by proton beams in solar flares.

- Telescope developments: THEMIS<sup>4</sup> went into full operation; this year’s observing schedule<sup>5</sup> lists 10 ESMN members as principal investigator). There is intensive collaboration (OP + IAC) to extend its capabilities to weak-field diagnosis using the Hanle effect. Similar IAC input concerns the GCT and SVST magnetometers. DOT<sup>6</sup> is midway along its three-year funding period to install and operate postfocus equipment for ESMN science (multi-channel proxy magnetometry with large-volume speckle restoration). The hardware design is complete and construction and procurement have started. New and ambitious telescope developments include the NSST and GREGOR. The first is the major reconstruction of the SVST<sup>7</sup> on La Palma into the New Swedish Solar Telescope<sup>8</sup> which is funded and well underway — the 48 cm SVST will see “last light” this autumn and the 96 cm NSST should be operating even within the ESMN contract period. IAC helped design the new turret through polarization modeling, UU participates in its construction. GREGOR<sup>9</sup> is a large German project to upgrade the GCT<sup>10</sup> on Tenerife into a 150 cm telescope for which funding is being sought (AIP). Its design incorporates the clamshell fold-away dome developed by UU for the DOT. Both NSST and GREGOR have high-resolution magnetometry as their major science driver. They will combine unprecedented angular resolution (through the use of adaptive optics which now becomes practical for solar spectroscopy) with precise spectropolarimetry using the inversion techniques currently being elaborated at AIP, OP and IAC. These new projects, both formulated since the ESMN start, guarantee substantial future emphasis on magnetometry in European solar physics beyond the ESMN duration. They confirm the choice of magnetometry as a prime European topic of interest and give yet more weight to our present ESMN efforts. (The same holds for the theoretically oriented solar MHD network in FP5: that complements ESMN beautifully.)
- Magnetometry developments: IAC and AIP obtained the first data from the three new liquid-crystal magnetometers completed last year. The OAC calibrated its VAMOS<sup>11</sup>

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<sup>1</sup>[sohowww.nascom.nasa.gov/soc/JOPs/jop097.txt](http://sohowww.nascom.nasa.gov/soc/JOPs/jop097.txt)

<sup>2</sup>[www.astro.su.se/~rouppe/umbralflash/flash.html](http://www.astro.su.se/~rouppe/umbralflash/flash.html)

<sup>3</sup>[www.astro.uu.nl/~rutten/dot/node1.html](http://www.astro.uu.nl/~rutten/dot/node1.html)

<sup>4</sup>[www.iac.es/project/themis](http://www.iac.es/project/themis)

<sup>5</sup>[www.iac.es/project/themis/planning/Resume\\_obs.html](http://www.iac.es/project/themis/planning/Resume_obs.html)

<sup>6</sup>[dot.astro.uu.nl](http://dot.astro.uu.nl)

<sup>7</sup>[www.astro.su.se/English/groups/solar/solar.html](http://www.astro.su.se/English/groups/solar/solar.html)

<sup>8</sup>[www.astro.su.se/English/groups/solar/NSST/nsst.html](http://www.astro.su.se/English/groups/solar/NSST/nsst.html)

<sup>9</sup>[www.kis.uni-freiburg.de/GREGOR/index\\_e.html](http://www.kis.uni-freiburg.de/GREGOR/index_e.html)

<sup>10</sup>[www.uni-sw.gwdg.de/research/exp\\_solar/GCT\\_text.html](http://www.uni-sw.gwdg.de/research/exp_solar/GCT_text.html)

<sup>11</sup>[www.na.astro.it/~alfredo/VAMOS/index.html](http://www.na.astro.it/~alfredo/VAMOS/index.html)

MOF, also its magnetic sensitivity, with new polarizers and applied for funding to construct a high-resolution version for the DOT. The G-band proxy magnetometry done at SVST and DOT is being calibrated through joint molecular line formation modeling at KVA and UU.

- Image restoration: the emphasis (also in the US) is now on adaptive optics, which was successfully tested at SVST and VTT and is also planned for THEMIS. For the DOT the choice is instead to install a speckle system, which has as disadvantage the terabytes of data to be processed post-detection, but which permits a large field of view.
- On-line imaging, data archiving and data reduction: the on-line imaging and archiving that were started in the first ESMN year were developed further at OAC and ESA; there are numerous websites that link into the SOHO real-time images<sup>12</sup> (or use them as screensaver<sup>13</sup>). Data reduction efforts are growing now that a number of ESMN multi-telescope campaigns have taken place. The general platform is IDL using the international SolarSoft package, with ESMN get-togethers for coordination and task divisions.
- Boundary conditions and modeling: UiO and KVA started an extensive programme to model the behaviour of waves in magnetised regions of the solar atmosphere including direct comparison with observations (such as umbral oscillations). IAC carried out an extensive programme on polarised radiative transfer (a new result has just been accepted by *Science*).
- Training programme: the ESMN appointees are well integrated in the seminar programmes at each partner. Some have taken part in (or actually led) observing campaigns. The appointees at UU and OAC interacted with industry. The first ESMN school and the ESMN meetings at international conferences (see below) brought most ESMN appointees together. Various appointee collaborations have been started (UiO–KVA, UU–AIP, OAC–OP).
- Public outreach: an ESMN public outreach website<sup>14</sup> was started. UU, ESA, UiO and KVA were also active in other outreach, for example by lecturing and writing popular-astronomy articles, in the principal astronomy site<sup>15</sup> in Norway and by supplying high-school lab exercises<sup>16</sup>. The lecture notes and exercises of the first ESMN school also remain web-accessible<sup>17</sup>. UiO helped prepare an exhibition at the Norwegian Technical Museum. OAC participated extensively in popular-astronomy lecture programmes in southern Italy and at the OAC Museum Auditorium.

## Principal networking activities

- Multi-telescope campaigns:
  - active region oscillations, September 1999, combining VTT, GCT, SVST and DOT with SOHO and TRACE, partners AIP (leader), KVA, UU, ESA.

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<sup>12</sup>[sohowww.estec.esa.nl/data/realtime-images.html](http://sohowww.estec.esa.nl/data/realtime-images.html)

<sup>13</sup>[sohowww.estec.esa.nl/whatsnew/screensaver.html](http://sohowww.estec.esa.nl/whatsnew/screensaver.html)

<sup>14</sup>[www.astro.su.se/~dorch/esmn](http://www.astro.su.se/~dorch/esmn)

<sup>15</sup>[www.astro.uio.no/ita/nyheter/astro\\_nytt.html](http://www.astro.uio.no/ita/nyheter/astro_nytt.html)

<sup>16</sup>[www.astro.uu.nl/~rutten](http://www.astro.uu.nl/~rutten)

<sup>17</sup>[www.astro.uio.no/school-99/VirtualSchool](http://www.astro.uio.no/school-99/VirtualSchool)

- arch filament systems, May and October 1999, combining THEMIS and VTT with SOHO, TRACE and YOHKOH, partners OP (leader), UiO, ESA.
- scheduling of campaigns for July and September 2000.
- ESMN meetings: network-wide at the Oslo ESMN school, during the 9th European Meeting on Solar Physics (Florence, September 1999) and during the 11th Cool Star Workshop (Tenerife, October 1999). Smaller coordination meetings in Potsdam, Oslo and Naples, plus a dozen partner visits.
- ESMN workshop: “Helium Line Formation in a Dynamical Solar Atmosphere”, April 5–7 2000, OAC.
- ESMN schools: the first ESMN school<sup>18</sup> at Oslo was widely advertised and filled to capacity (40 students), with two of the four teachers and 15 students from ESMN partners. It was an in-depth school on radiative transfer and radiation hydrodynamics, adding elaborate numerical exercises to high-level lectures during two intensive weeks. The students (postdocs and graduates) also presented their own research. The second ESMN school will be integrated into the XIIth Canary Island Winter School, part of a prestigious sequence for which the IAC partner group successfully bid with the ESMN topic constituting half the curriculum (“Astrophysical Spectropolarimetry”. The First Announcement<sup>19</sup> and poster went recently out worldwide.
- ESMN observing: the ESMN telescopes in the Canary Islands makes IAC a network “hub”. The THEMIS group has an office at the IAC; THEMIS staff is not officially seconded from OP to IAC but effectively there for 10 personmonths/year. The IAC group itself runs spectropolarimeters on VTT and SVST.

## Appointments of young researchers

All ESMN vacancies are now filled except for 24 personmonths at OAC (ESA’s slot is filled per July 1). The leftover personmonths are likely to be filled with shorter-term appointments including graduate students.

The ESMN remains very happy with the high quality of its appointees. Some well-qualified candidates that could not be hired have fortunately found alternative postdoc positions, in one case within an ESMN group (OP).

## Interactions with industry

KVA continued working closely together with Compaq on developing new interface technology for high-speed CCD cameras and adaptive optics control. The cooperation resulted in another joint project with the Ecole Polytechnique (Paris) supervised by Compaq (M. Shand), in a joint paper with M. Shand as first author, in the hiring of a Compaq specialist as systems engineer at KVA, and in KVA participation in adaptive optics projects

<sup>18</sup>[www.astro.uio.no/school-99/VirtualSchool](http://www.astro.uio.no/school-99/VirtualSchool)

<sup>19</sup>[www.iac.es/winschool2000/info.html](http://www.iac.es/winschool2000/info.html)

elsewhere. KVA and UU continue their close collaboration with Lockheed-Martin in observing and data analysis (there are presently three UU-educated young solar physicists at Lockheed-Martin). IAC are participating in a balloon-borne telescope proposal involving Lockheed-Martin. OAC interacted with EIS SRL in Rome in developing the VAMOS mounting, magnet holders and tracking system. The three new IAC and AIP liquid-crystal spectropolarimeters at the Canary Island telescopes are complete and no longer require industrial liquid-crystal research. The DOT team has postponed development of fiber spectrometry until after the completion of the DOT speckle system. It is discussing strategies for the latter with COMPAQ.

## Joint Publications

- Balança, C. and Vogt, E.: 1999, “Diagnostic of proton beams in solar flares”, in A. Wilson (Ed.), *Magnetic Fields and Solar Processes*, Procs. Ninth European Meeting on Solar Physics, ESA SP-448, ESA Publ. Div., ESTEC, Noordwijk, 749–751  
*Balança: OP; Vogt: OAC*
- Hansen, I., Engvold, O., Schmieder, B., Mein, N., and Mein, P.: 1999, “Bright Rims and Dopplershifts in H $\alpha$  Filaments”, in A. Wilson (Ed.), *Magnetic Fields and Solar Processes*, Procs. Ninth European Meeting on Solar Physics, ESA SP-448, ESA Publ. Div., ESTEC, Noordwijk, 491–496  
*Hansen, Engvold: UiO; Schmieder, Mein, Mein: OP*
- Innes, D. E., Inhester, B., Srivastava, N., Brekke, P., Harrison, R. A., Matthews, S. A., Noëns, J. C., Schmieder, B., and Thompson, B. J.: 1999, “Multi-wavelength observations of the onset phase of a coronal mass ejection”, *Solar Phys.* **186**, 337–361  
*Brekke: UiO; Schmieder: OP. Refereed journal; copy added*
- Jimenez, A., Cortes, T. R., Severino, G., Marmolino, C., and the VIRGO, GOLF, and MDI Teams: 1999, “Phase differences and gains between intensity and velocity low degree acoustic modes measured by SOHO”, *Astrophys. J.* **525**, 1042–1055  
*Roca Cortes: IAC; Severino: OAC. Refereed journal; copy added*
- Martínez Pillet, V., Collados, M., Sanchez Almeida, J., Gonzalez, V., Cruz-Lopez, A., Manescau, A., Joven, E., Paes, E., Diaz, J. J., Feeney, O., Sanchez, V., Scharmer, G. B., and Soltau, D.: 1999, “LPSP & TIP: Full Stokes Polarimeters for the Canary Islands Observatories”, in T. Rimmele, R. R. Radick, and K. S. Balasubramaniam (Eds.), *High Resolution Solar Physics: Theory, Observations and Techniques*, Proc. 19th Sacramento Peak Summer Workshop, ASP Conf. Series 183, 264–272  
*Martínez Pillet, Collados, Sanchez Almeida: IAC; Scharmer: KVA*
- Muglach, K. and Fleck, B.: 1999, “Waves in the Quiet Sun’s Chromosphere”, in J.-C. Vial and B. Kaldeich-Schuermann) (Eds.), *Plasma Dynamics and Diagnostics in the Solar Transition Region and Corona*, ESA SP-446, 499–502  
*Muglach: AIP; Fleck: ESA*
- Muglach, K., Fleck, B., Schühle, U., Stolpe, F., Foing, B. H., and Wilhelm, K.: 2000, “Dynamics of Chromospheric and Transition Region Lines Observed with SOHO/SUMER and the GCT/Tenerife”, *Adv. Space Research* **25**, 1731–1734  
*Muglach: AIP; Fleck, Foing: ESA. Refereed journal; copy added*
- Schmieder, B., DeLuca, E., Mein, N., Mein, P., Malherbe, J. M., Wilken, V., Staiger, J., Engvold, O., and Hanssen, I.: 1999a, “Emerging Flux and Heating of coronal loops in Active Regions”, in A. Wilson (Ed.), *Magnetic Fields and Solar Processes*, Procs. Ninth European Meeting on Solar Physics, ESA SP-448, ESA Publ. Div., ESTEC, Noordwijk, 653–658  
*Schmieder, Mein, Mein, Malherbe: OP; Engvold, Hanssen: UiO*
- Schmieder, B., Kotrc, P., Heinzel, P., Kucera, A., and Andretta, V.: 1999b, “Diagnostics constraints on prominence parameters from SOHO and ground-based observations”, in A. Wilson (Ed.), *Magnetic Fields and Solar Processes*, Procs. Ninth European Meeting

- on Solar Physics, ESA SP-448, ESA Publ. Div., ESTEC, Noordwijk, 439–444  
*Schmieder: OP; Andretta: OAC*
- Shand, M., Scharmer, G. B., and Wei, W.: 1999, “Correlation tracking and Adaptive Optics Control Using Off-The-Shelf Workstation Technology”, in T. Rimmele, R. R. Radick, and K. S. Balasubramaniam (Eds.), *High Resolution Solar Physics: Theory, Observations and Techniques*, Proc. 19th Sacramento Peak Summer Workshop, ASP Conf. Series 183, 231–238  
*Shand: COMPAQ; Scharmer, Wei: KVA.*  
*This paper resulted from the ESMN–COMPAQ industrial connection.*
- Straus, T., Severino, G., Deubner, F.-L., Fleck, B., Jefferies, S. M., and Tarbell, T.: 1999, “Observational constraints on models of the solar background spectrum”, *Astrophys. J.* **516**, 939–945  
*Straus, Severino: OAC; Fleck: ESA. Refereed journal; copy added*
- Vogt, E. and Hénoux, J.-C.: 1999, “Observations of linear polarization in the H $\alpha$  line during two solar flares”, *Astron. Astrophys.* **349**, 283–294  
*Vogt: OAC; Hénoux: OP. Refereed journal; copy added*
- Vogt, E., Hénoux, J.-C., and Sahal-Bréchet, S.: 1999, “Impact polarization of the H $\alpha$  line during solar flares”, in K. Nagendra and J. Stenflo (Eds.), *Solar Polarization*, Kluwer Academic Publishers, 431–442  
*Vogt: OAC; Hénoux, Sahal-Bréchet: OP*
- Wiik, J. E., Dammasch, I. E., Schmieder, B., and Wilhelm, K.: 1999, “Multiple-Thread Model of a Prominence Observed by SUMER and EIT on SOHO”, *Solar Phys.* **187**, 405–426  
*Wiik: UiO; Schmieder: OP. Refereed journal; copy added*

## ESMN Team Constitutions

### UU (Utrecht)

Name	Position	Funding	Comment
Felix Bettonvil	Scientist/Engineer	UU	
Robert Hammerschlag	Scientist/Engineer	UU	
Max Kuperus	Professor	UU	
Thijs Krijger	Graduate Student	NWO	
Robert Rutten	Senior Scientist	UU	
Jan Kuijpers	Senior Scientist	UU/KUN	0.8 UU, 0.2 KUN
Pit Sütterlin	Post Doc	ESMN	

NWO = The Netherlands Organization for Scientific Research

KUN = Catholic University Nijmegen

Emeritus Professor Cornelis Zwaan deceased on June 16, 1999. He was very active in the ESMN field until just weeks before his untimely death.

### IAC (La Laguna)

Name	Position	Funding	Comment
Javier Trujillo Bueno	Cientifico Titular	CSI	
Manolo Collados Vera	Profesor Titular	ULL	
Jorge Sanchez Almeida	Research Scientist	IAC	
Valentin Martinez Pillet	Research Scientist	IAC	
Olaf Dittmann	Post Doc	ESMN	

CSI = Consejo Superior de Investigaciones

ULL = University of La Laguna

**OAC (Naples)**

Name	Position	Funding	Comment
Giuseppe Severino	Associate Astronomer	OAC	
Vincenzo Andretta	Research Astronomer	OAC	
Maurizio Oliviero	Research Astronomer	OAC	from Aug 1 1999
Etienne Vogt	Post Doc	ESMN	
Pier Francesco Moretti	Post Doc	OAC	from Dec 15 1999
Thomas Straus	Research Astronomer	OAC	Mar 1999 – Feb 2003
Alfredo Tripicchio	Graduate Researcher	OAC	until Nov 2001
Kevin Reardon	Graduate Researcher	OAC	until Feb 2000

**UiO (Oslo)**

Name	Position	Funding	Comment
C. Rosenthal	Post Doc	ESMN	from Dec 12 1998
M. Carlsson	Professor	UiO	
O. Engvold	Professor	UiO	
V. Hansteen	Professor	UiO	
P. Maltby	Professor	UiO	
A. McMurry	Post Doc	UiO	from Jan 1 2000

**KVA (Stockholm)**

Name	Position	Funding	Comment
Pete Dettori	Science Engineer	KVA	from Jan 1 2000
Bertil Dorch	Post Doc	ESMN	
Boris Gudiksen	PhD student	ESMN	from Nov 1 1999
Dan Kiselman	Research Associate	KVA	
Mats Löfdahl	Research Associate	KVA	75%
Luc Rouppe van der Voort	PhD student	KVA	
Göran Scharmer	Professor	KVA	
Wang Wei	Science Engineer	KVA	20% May–Dec 1999

**AIP (Potsdam)**

Name	Position	Funding	Comment
Horst Balthasar	Scientist	AIP	
Axel Hofmann	Scientist	AIP	
Karin Muglach	Post Doc	ESMN	
Axel Settele	PhD student	DFG	
Jürgen Staude	Professor	AIP	

DFG = Deutsche Forschungsgemeinschaft

**OP (Paris)**

Name	Position	Funding	Comment
Pierre Mein	Astronome	MEN	
Brigitte Schmieder	Astronome	MEN	
Sylvie Sahal-Bréchet	Directeur de Recherche	CNRS	
Jean-Marie Malherbe	Astronome	MEN	
Pascal Demoulin	Astronome Adjoint	MEN	
Kostas Tziotziou	Post Doc	ESMN	from July 1 1999

MEN = Ministère de l'Éducation Nationale

CNRS = Centre National de la Recherche Scientifique

Jean Rayrole and Nicole Mein retired officially during the year but remain active in the field.

**ESA (Noordwijk)**

Name	Position	Funding	Comment
Bernhard Fleck	Staff member	ESA	
Paal Brekke	Staff member	ESA	
Bernard Foing	Staff member	ESA	
Stein Haugan	Staff member	ESA	
Luis Sanchez	Staff member	ESA	

## Travel and Conference Participation by ESMN Fellows

### Bertil Dorch (KVA)

- Annual Workshop of the Solar-section of the Danish Astron. Soc., Arden, Denmark, May 1, 1999
- “Solkurs”, Workshop for Gynmasium Lectures, Haslev, Denmark, May 5–7, 1999
- ESMN summer school, Institutt for Teoretisk Fysikk, Oslo, Norway, June 1 – 11, 1999
- Swedish Astronomer Day, Stockholm, Sweden, October 15 – 16, 1999
- The Parallel Super-computing Center Anniversary, PDC, Stockholm, Sweden, November 1, 1999
- “Simulations Visualization on the Grid”, PDC, Stockholm, Sweden, December 15 – 17, 1999
- “Physics of Accretion and Associated Outflows”, TAC, Copenhagen, Denmark, January 5 – 8, 2000
- ESMN meeting, Institutt for Teoretisk Fysikk, Oslo, Norway, February 29 – March 2, 2000

### Olaf Dittmann (IAC)

- ESMN Summer School on Radiative Transfer and Radiation Hydrodynamics, Oslo, June 1–11 1999

### Boris Gudiksen (KVA)

- “Simulations Visualization on the Grid”, PDC, Stockholm, Sweden, December 15 – 17, 1999
- “Physics of Accretion and Associated Outflows”, TAC, Copenhagen, Denmark, January 5 – 8, 2000
- ESMN meeting, Institutt for Teoretisk Fysikk, Oslo, Norway, February 29 – March 2, 2000

### Karin Muglach (AIP)

- 8<sup>th</sup> SOHO Workshop, Paris, France, June 22–25, 1999
- 11<sup>th</sup> Cambridge Workshop on “Cool Stars, Stellar Systems and the Sun”, Puerto de la Cruz, Tenerife, Spain, October 4–8, 1999
- Workshop “75 Jahre Einsteinurm – Sonnenforschung in Geschichte und Gegenwart”, Potsdam, Germany, December 7–8, 1999
- Workshop “Helium Line Formation in a Dynamical Solar Atmosphere”, Napoli, Italy, April 5–7, 2000

**Colin Rosenthal (UiO)**

- ESMN Summer School on Radiative Transfer and Radiation Hydrodynamics, Oslo, June 1–11 1999
- ESMN Collaborative Visit to Stockholm Observatory (KVA), Stockholm, Sweden, April 10 – 12, 2000

**Kostas Tziotziou (OP)**

- Atelier THÉMIS, Meudon, France, December 1–3 1999
- Colloquium Astronomy Department of University of Utrecht, April 13–18 2000

**Etienne Vogt (OAC)**

- ESMN Summer School on Radiative Transfer and Radiation Hydrodynamics, Oslo, June 1–11 1999
- 9<sup>th</sup> European Meeting on Solar Physics: Magnetic Fields and Solar Processes, Florence, Italy, September 12–18, 1999
- Workshop of the “Programme National Soleil-Terre”, Nouan Le Fuzelier, France, February 1–3, 2000