Programma Nazionale di Ricerche in Antartide (PNRA)

Final project report

Project ID	2004/2.09
Title	Improvement of LIDAR Observatories of NDSC in Antarctica
Principal investigator	Francesco Cairo
Institution	ISAC
Email	f.cairo@isac.cnr.it
Duration	3 years
Assigned funding	50.000,00 Euro

Activities and results

In 2004 a completely new lidar system has been constructed and installed in the American Antarctic base of McMurdo. This system has been calibrated and is now fully operative, except for the infrared channel. In 2005 a small telescope has been added for tropospheric observations , typically from 1-20 km. A new software has been developed , in IDL, for elaborating and calibration of the raw data, permitting a preliminary analysis. Successively this software has been expanded to include graphical output, as well a san adequate format (AMES) for archiving the data in the NDACC (formerly NDSC) data base.
In 2005 a new lidar system has been installed in the French Antarctic station of Dumont D'Urville. This system has been developed in collaboration with the French CNRS partner and has been partially constructed at ISAC in Rome. Before being shipped to Dumont D'Urville the lidar has been tested in Rome.

Results

1) American science technicians have been instructed to operate the Lidar at McMurdo for routine measurements during the Antarctic winter.
2) We have participated to several workshops organized by the French CNRS at the Observatory Haute Provence (OHP), in order to discuss the data obtained with the Lidar in Dumont D'Urville.
3) Every year the preparation and test phase, followed by routine measurements have been performed in collaboration with the American science technician in McMurdo.
4) During the 3 years of the project about 200 days of observations have been recorded and successively analyzed and archived.
5) All data have been calibrated, analyzed and archived in the NDSC/NDACC data base.

Products

A – papers in scientific magazines

1. Adriani; P. Massoli; G. Di Donfrancesco; F. Cairo; M.Moriconi; M. Snels, "Climatology of polar stratospheric clouds based on lidar observations from 1993 to 2001 over McMurdo Station, Antarctica", J. Geophys. Res., 109, D24211, doi:10.1029/2004JD004800 (2004).
2. David, S. Bekki, N. Berdunov, M. Marchand, M. Snels and G. Mégie, "Classification and scales of Antartic polar stratospheric clouds using wavelet decomposition", Journal of Atmospheric and Solar-Terrestrial Physics, volume 67, issue 3, (2005) 293-300.
3. M. Höpfner, B.P.Luo, P.Massoli, F. Cairo, R. Spang, M. Snels, G. Di Donfrancesco, G. Stiller, T. von Clarmann, H. Fischer and U. Biermann, "Spectroscopic evidence for -NAT, STS and ice in MIPAS infrared limb emission measurements of polar stratospheric clouds", Atmos.Chem.Phys.Discuss. 5, 10685-10721 (2005).
4. M. Höpfner, B.P.Luo, P.Massoli, F. Cairo, R. Spang, M. Snels, G. Di Donfrancesco, G. Stiller, T. von Clarmann, H. Fischer and U. Biermann, "Spectroscopic evidence for NAT, STS and ice in MIPAS infrared limb emission measurements of polar stratospheric clouds", Atmos.Chem.Phys. 6, 1201-209 (2006).

B – book chapters

C - proceedings of international conferences

D – proceedings of national meetings and conferences

E – thematic maps

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F – patents, prototypes and data bases

G – exhibits, organization of conferences, editing and similar

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H - formation (PhD thesis, research fellowships, etc.)

1. Research fellowship (Assegno di ricerca)*"Studio di nubi stratosferiche polari (PSC) in antartica sulla base di misure LIDAR",* Giampaolo Ciolli, (1/12/2006 – 31/5/2007)

Research units

Unit 1

Francesco Cairo
Marcel Snels
Guido Didonfrancesco
Maurizio Viterbini
Francesco Cardillo

Date:

Notes

- From 23-1-2004 until 18-2-2004 Dr. Marcel Snels has participated to the XIXth campaign in the American base of McMurdo. During this campaign a new lidar has been installed and tested.
- In August 2004 Dr. Francesco Cairo has participated to the campaign in McMurdo. During this campaign the new lidar has been calibrated and first measurements of polar stratospheric clouds were completed with the new system.
- During WINFLY 2004 the technician ISAC , Roberto Morbidini has performed an intesive measurement campaign in McMurdo from August 20 until Octobre 3th.
- During WINFLY 2005 (August 20th until Octobre 5th) Dr. Federico Angelini was involved in an intensive measurement campaign.