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Giorgio Poretti

Professor of Mathematics at the University of Trieste since 1969 when he started a Fourier analysis of tidal data recorded at the Trieste Mareograph and developed a numerical model for the computation of water movements in semi-closed basins (Adriatic see).

Researcher in Topography, applied Geophysics and Geodesy he carried out, since 1975, several projects in the Karakorum and in the Nepali Himalayas. Two **deep seismic sounding** campaigns were carried out in the Karakorum-Pamirs area (**1975-'79**) for the determination of the thickness of the Earth's crust.



1975 Deep seismic sounding in the Sango Sar lake (near Astor).

Gravity and magnetic measurements profiles were performed in Pakistan (**Khapalu-Skardu-Astor-Gilgit-Chitral, 1979, Skardu-K2 Base Camp**) and in the Nepali Himalayas for the computation of the gravity anomalies and the local geoid under the leadership of prof. Antonio Marussi and in collaboration with the **Geological Survey of Pakistan (GSP)** and the Nepal Academy of Science and Technology.



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1979 Road problems between Bunji and the Ramghat pul.

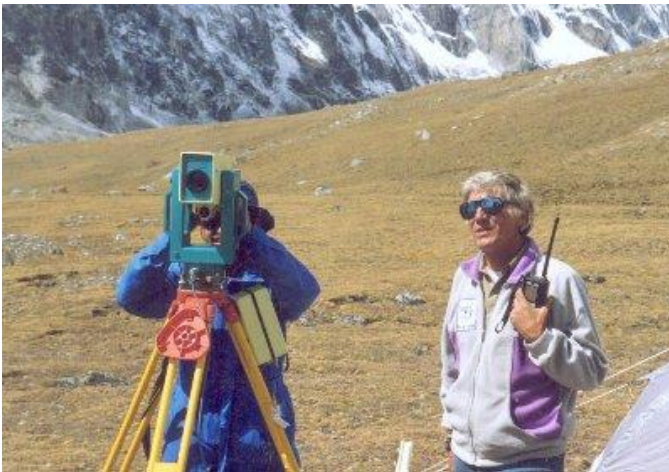


More **gravity and magnetism profiles** were observed in Nepal during the '80ies ((**Trisuli River Valley 1983, Arun Valley 1986, Terai plains 1987, Kathmandu-Tatopani, Kathmandu-Lukla-Everest Base Camp 1992**)) in collaboration with the Royal Nepal Academy of Science and Technology (RONAST). Since 1987 he is member of the Nepal Academy for Geological sciences.

Nominated by Prof. Ardito Desio as **member of the EV-K2-CNR Committee** for high altitude research, participated in the construction of the High Altitude Pyramid Laboratory near Everest Base Camp, and carried out in **1991** an extensive **GPS campaign in Nepal and Southern Tibet** in collaboration with the National Bureau of Surveying and Mapping of China. (NBSM).

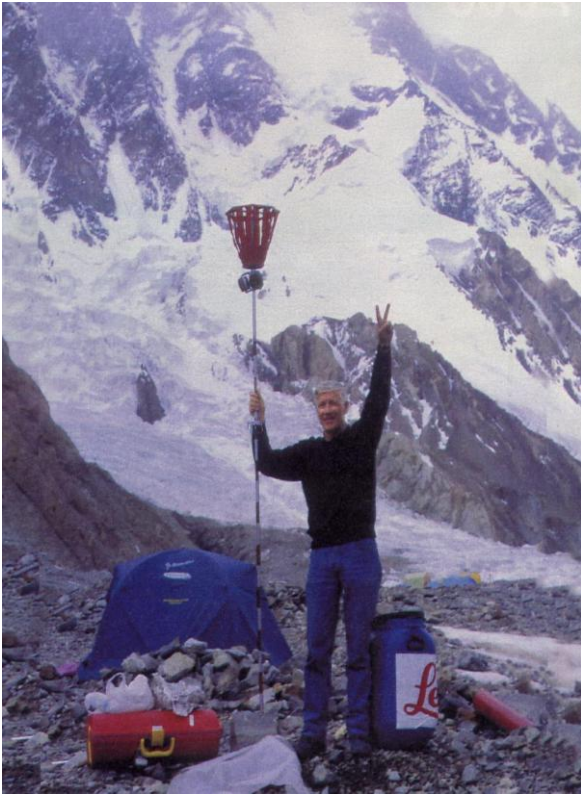
In **1992** led the italian scientific team in a joint project with NBSM and performed the **first GPS measurement of the summit of Mt Everest**.

In 1995 he was awarded in Koeln (Germany) the price “**Das Goldenen Lot**” from the “**Verband der Vermessungsingenieure**” (Union of the German Surveyors) for the measurement of Mt. Everest performed in 1992.



1992 The first measurement of Mt. Everest with topographic instruments on the summit and Benoit Chamoux

In 1996 **carried out the measurement of Mt. K2** with classical and GPS technology in collaboration with the PAGS and the Geological Survey of Pakistan.



1996 The measurement of Mt. K2

In **1999** performed a new measurement of **Mt. Matterhorn** and in **September 2000** the **measurement of Mount Dufour** in the Swiss-Italian Alps.

In 1999 he was among the promoters of the Geomatics Laboratory for research on automated cartography and geodesy.

In **January 2001** he led the Italian team who remeasured **Mount Aconcagua** in the Andes and performed the first gravity profile from the Atlantic to the Pacific Ocean.

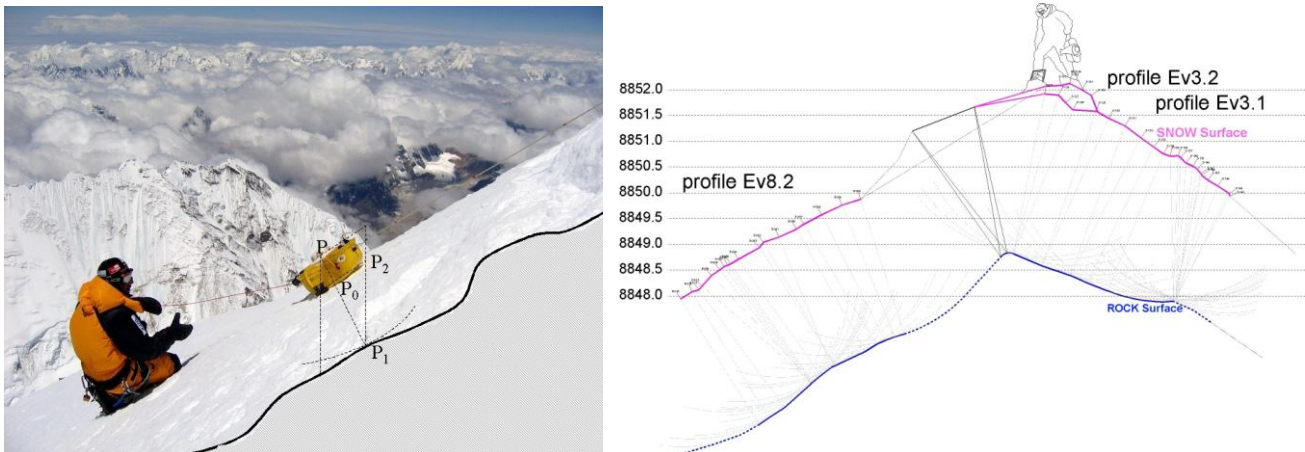
In 2003 he performed a gravity survey around the Annapurna massif in the Nepali Himalayas



2002 Gravity surveying around the Annapurna massif

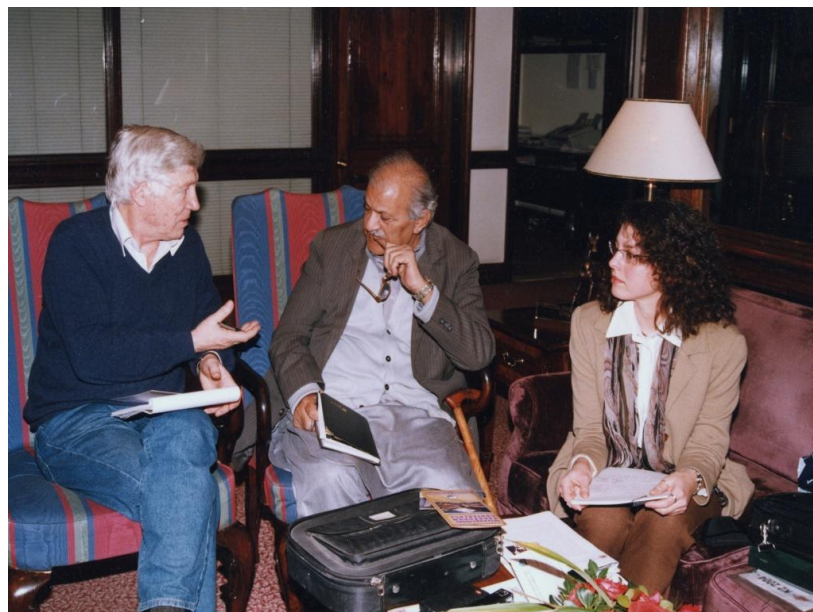
In the years **2000-04** he realized a new system (**ASTRA**) for the establishment of **astrogeodetic stations** and the determination of the **deflection of the vertical**. This instrument was tested in the Alps, used during the campaign in Argentina and in a survey around the Annapurna Massif in Nepal. ASTRA was also adopted by the Istituto Geografico Militare, the official cartographic institute of Italy.

Since **2003** he is leading the project that realised a **Ground Penetrating Radar (GPR)** coupled with a GPS for the measurement of the depth of the snow on the summit of snow covered mountains and tested it on **Mt. Everest (24th May 2004)** and Mont Blanc (September 2004).



2004 Surveying the depth of the snow on the summit of Mt Everest

With the participation of researchers appointed by the Pakistan Academy of Geological Sciences, during the **July 2004** Italian expedition to K2 he performed a **geodetic link between Base Camp (Gilkey Memorial), Urdukas, Askole and the trigonometric point in Skardu** with GPS instruments. The measurement of flow velocity of the Godwin Austen glacier was also repeated.



2004 In Lahore with prof. F. A. Shams and Beth Shommer

In **December 2004** he was appointed as **Fellow of the Pakistan Academy of Geological Sciences** and member of the committee on "short term disasters".

Following the 2005 announcement for Scientific Research Programmes of Relevant National Interest (PRIN) the research programme was funded on "**Statistical and Cinematic GPS (Mobile Mapping Systems) and Geotechnical Methods for Monitoring Slopes and Coasts**" for which he was local scientific referent.

In the **Summer 2006** the Region Friuli-Venezia Giulia approved his proposal of **International Cooperation** for a technical-scientific aid to the reconstruction of earthquake hit of area Kashmir. The project named "**Realisation of a Geomatics Laboratory at the Azad Jammu and Kashmir University (AJKU)** for the Management of the Hydro-Geologic and Seismic Risk" aims at establishing contacts between researchers of the University of Azad Kashmir and the scientists who took part in the reconstruction of Friuli after the '76 earthquake. The project is based on a **three years programme**.



2006 Visit to the AJK University in Muzaffarabad

The first part of this project, involving the training in Italy of four Pakistani researchers, was carried out between April and October 2007.



On the Ravedis dam (PN-Italy)



Near the Vajont dam (PN-Italy)

In February 2008 the second part has started and in December arrive in Trieste the second shift of 4 researchers from Pakistan. Two from the Bahria University of Islamabad and two from the AJK University in Muzaffarabad. Two of them remained in Trieste for a course on landslides control and monitoring with visits to the Ravedis and Vajont dams in the northern part of the Regione Friuli Venezia Giulia.

In April 2009 the Italian Ministry of Education in connection with the Ministries of Foreign affairs of Italy and Pakistan approves a new project for the "**Monitoring of the Tectonic Movements of the Nanga Parbat Haramosh Massif and along the Indus River**" to be realized by the Ev-K2-CNR Committee with the collaboration of the Department of Geosciences of the University of Trieste, The Bahria University of Islamabad and the Karakorum International University the new high education environment in Gilgit.

The project has the purpose of a preliminary survey in the Nanga Parbat area and the area where the Diamer-Basha dam will be built, one of the most important enterprises of the government of Pakistan for the alleviation of the lack of electricity in the country and for implementing the irrigation network during the dry seasons.



The survey scheme in the Diamer-Basha dam location with a view of a huge landslide behind Gino De Min

The project was carried out in five phases:

1. The study of the geology of the area
2. The survey for the determination of the points to be monitored
3. The building of the pillars for the benchmarks
4. The selection of the instruments and the performance of the first survey
5. The processing of the data.

Two permanent GNSS stations (GPS+ Glonass+ Galileo) were installed in Islamabad and in Gilgit as reference outside the investigated region. The recorded data are made available through internet to the scientific community. One point was located in Muzaffarabad and two on the massif in Harchu and in Astor. In the Basha dam area a local network was established with 6 points, three on each bank of the river.

The reconnaissance was carried out in May, the building of the benchmarks was done in August and the survey took place in November 2009. December was left for the data processing.



August 2009 at the Diemer- Basha dam area: 48°C, 0% humidity



"Aspettami laggiù, non mancherò d'incontrarti in quella vuota valle" E. A. Poe

The selection of the instruments was carried out in October and the measurements between the 12th and the 26th of November. Starting from the two permanent stations in Islamabad and Gilgit, then the GPS points were surveyed at Harchu and Rama bungalow. Finally the network at the Basha Dam.



The permanent GNSS stations in Gilgit (KIU) and Islamabad (Bahria University)

Two papers were presented on this subject. The first at the Convegno del Gruppo Nazionale della Terra Solida Trieste 15-17 November 2009 when the establishment of the Network was announced. The second will be presented in May in Vienna where the first results will be given for the measurement of the local network in the Basha dam area.

The measurements will be repeated every year for the next five years.

Portfolio. Mathematics and informatics applied to Earth Sciences. Geophysics, geology, topography.

Impact.

Main projects:

- a) Measurement of the Earth's highest peaks,
- b) Realisation of instruments for geophysical and topographic surveying like the system for the determination of the deflection of the vertical and the instrument for the depth of the snow.
- c) Educational project for the use of GIS techniques for prevention and reconstruction after hydro-geological disasters.
- d) GNSS network for monitoring tectonic and landslide movements.

The system developed for the determination of the deflection of the vertical has been adopted by the Italian Istituto Geografico Militare.

The instrument for the determination of the depth of the snow is being modified for being employed in Civil Defence operations.

The complete list of Publications can be seen on the web-site giorgio poretta.

1. I. Finetti, F. Giorgetti, G. Poretta - *The Pakistani segment of the DSS Profile Nanga Parbat-Karakul (1974-1975)*. Bollettino di Geofisica Teorica e Applicata, Vol. XXI, n. 83, Trieste, 1979.
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3. C. Ebblin, A. Marussi, G. Poretta, M. Rahim, P. Richardus - *Gravity Measurements in the Karakorum*. Boll. di Geofisica Teorica e Applicata, n. 99-100, Trieste, 1983.
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5. G. Poretta - *Magnetic Profiles along the Karakorum Range*. Bollettino di Geofisica Teorica e Applicata, n. 99-100, Trieste 1983.
6. G. Poretta. - *Gravity Anomalies in North Eastern Afghanistan and on the Pamirs Syntaxis*. Himalaya-Karakorum Workshop 13-15 February 1987. di "Rendiconti Lincei. Scienze Fisiche e Naturali, vol. II 1990".
7. G. Poretta, G. Baticci. - *Gravity Models of the Deep Structures of the Karakorum Range*. Himalayan-Karakorum-Tibet Workshop meeting. 5-6 October 1988. "Rendiconti-Sez. B: Scienze Chimiche e Fisiche, Geologiche e Minerarie", vol. 124 (1990), dell'Istituto Lombardo Accademia di Scienze e Lettere.
8. G. Poretta, G. Baticci & P. Signanini. - *Gravity anomaly Profiles in Central and Eastern Nepal*. Himalayan-Karakorum-Tibet Workshop meeting. 5-6 October 1988. (Pubblicato il solo abstract a cura del convegno).
9. N. Cingolani, F. Pergolani, G. Poretta e P. Signanini. *Prospezioni sismiche a ridotta profondità: nuovi metodi di acquisizione ed elaborazione dati in relazione alle problematiche connesse con la pianificazione territoriale*. Memorie della Società Geologica Italiana vol. n. 37, 1987.
10. M. Anzidei, G. Poretta et al. *La rete Geodetica GPS del Nepal Orientale nell'ambito del progetto EV-K2-CNR*. Atti dell'11° convegno annuale del gruppo Nazionale di Geofisica della Terra Solida. Roma 9-11 dicembre 1992.
11. Giorgio Poretta. *Das Mt. Everest Abenteuer*. Der Vermessungsingenieur 4/93. Verlag Chemielorz, Wiesbaden 1993.
12. Giorgio Poretta. *The new measurement of Mt. Everest*. Dal volume "Everest minus 2 metres". Ed. Initiative Paris 1993. Italian-German e Franch-English
13. Giorgio Poretta, C. Marchesini e A. Beinat. *GPS Surveys Mount Everest*. GPS World October 1994. Pgg. 32-44
14. Giorgio Poretta, Agostino da Polenza. *La medicion del Siglo dell'Everest*. Universidad Politecnica de Madrid, III Jornadas tecnicas 15. Abril 1996.
15. G. Poretta, C. Marchesini, A. Beinat, F. Palmieri, A. Fatmi, A. Marchesini & I. H. Shah. *Misure geodetiche in Himalaya e nuova misura del K2*. Dal volume "Ragni sul K2" Ed. Ferrari, 1996.
16. R. Purruherr, M. Eckardt, B. Kettling & G. Poretta. *Misure glaciologiche sul Ghiacciaio Godwin Austen*. Dal volume "Ragni sul K2" Ed. Ferrari, 1996.
17. Giorgio Poretta. *High altitude surveying in the Himalayas*. Proceedings of the First Meeting on Cartography around 15° East. Supplemento al n. 1/1998 della Rassegna Tecnica del FVG. Pp.15-17.
18. Giorgio Poretta. *Geophysical, Geological and Geographycal features of the Himalayas*. Ecovision World Monograph Series, Backhuys Publishers, Leiden 1998; pp.19-34.
19. Giorgio Poretta. *150 years of measuring in the Himalayas*. Reporter n. 41, Leica Heerbrugg, 1999; pp 13-19

20. G. Poretti. *Das Mt. Everest Abenteuer-wie die neue Hohe errechnet würde*. Der Vermessungsingenieur 2/2000. Verlag Chemielorz, Wiesbaden; pp. 100-101.
21. Giorgio Poretti, R. Purrucherr, C. Marchesini, A. Beinat, M. Eckart & A. Marchesini. *Geodetic Measurements in the Himalayas and New Measurement of Mount K2*. Bollettino di Geofisica Teorica ed Applicata. Vol. 41 n. 3-4, pp. 219-231, 2000.
22. Marco Lipizer, Claudio Marchesini and Giorgio Poretti. *ASTRA: a new system for the measurement of the deflection of the vertical in Nepal*. Proceedings of the 3rd International Workshop on the Mountains Kathmandu 3-9 March 2002.
23. G. Poretti, M. Lipizer, C. Marchesini, A. Marchesini e J. Suarez . *La misura dell'Aconcagua*. Atti del XXI Convegno Nazionale GNTGS (19-21 novembre 2002). ISBN 88-900385-5- 1.
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26. G. Poretti. *The Height of the Karakorum-Himalaya Mountain Range*. Proceedings of the International Karakorum Conference 26-28 Aprile 2005.
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28. G. Poretti, R. Mandler, M. Lipizer. *The Height of Mountains*. Bollettino di Geofisica Teorica ed Applicata; vol n. 47 12/2006.
29. G. Poretti, R. Mandler, M. Lipizer. *The GPS Station at the Pyramid Geodetic Laboratory*. Bollettino di Geofisica Teorica ed Applicata. vol. n. 47; 12/2006.
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31. G. Poretti. *Is Mt. Everest Higher than 100 Years Ago*. Su "The Seventy great Misteries of the Natural World" Ed. Thames & Hudson London pp.68-70, 12/2007.
32. Poretti, G., C. Calligaris, S. Tariq, H. Khan, F. Zubair and G. De Min. 2010. Geological, Geophysical and Topographic Measurements in the Diamer Basha Dam Area. *European Geosciences Union General Assembly 2010*, Vienna, Austria, 2-7 May, 2010 (Abstract)
33. Poretti, G., C. Calligaris, S. Tariq, H. Khan, F. Zubair, & A. Mereu. 2009. The Monitoring of the Nanga Parbat-Haramosh Massif. *GNGTS Conference*, Trieste, Italy, 16-19 November, 2009.