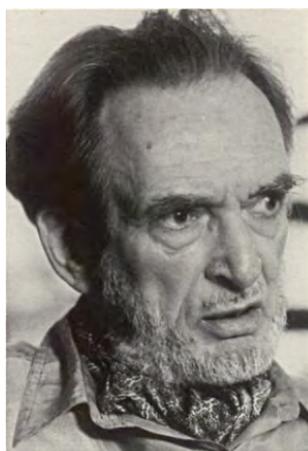


## IN MEMORIAM

***Prof. Dr. WILLI DANSGAARD***  
***1922-2011***



Danish geophysicist Prof. Willi Dansgaard, who pioneered stable isotope meteorology and became the founding father of ice core paleoclimatology, died on January 8, 2011 in Copenhagen at the age of 88.

Willi Dansgaard studied at the University of Copenhagen and then worked for the Danish Meteorological Institute. Between 1947 and 1948 he was stationed at the Geomagnetic Observatory in Godhavn (now Qeqertarsuaq), which started his lifelong engagement with Greenland science. In 1951 Willi Dansgaard moved back to the Biophysical Laboratory of the University of Copenhagen, where he was in charge of a newly acquired mass spectrometer. On a rainy weekend in June 1952 Willi Dansgaard started collecting rainwater samples in the Institute courtyard, out of curiosity about the isotopic composition of different rain showers. His results hinted at the possibility that stable isotopes of oxygen and hydrogen in rainwater could tell the temperature and story of the air mass it had condensed from. Willi Dansgaard developed a simplified model of the isotopic turn-over in atmospheric water circulation and started collecting meteoric water samples from sites worldwide, through cooperation with expeditions, the East Asiatic Company, personal contacts and later work for the global IAEA-WMO network monitoring the pollution from nuclear experiments. The sum of this efforts resulted in the seminal work "Stable isotopes in precipitations", published in the journal *Tellus* in 1964. During the same years, Willi Dansgaard pondered that, by assuming the present-day relation between temperature and isotopic composition holds in cold regions when going back in time, it would be possible to reconstruct the climate of the past based on isotope analyses of old meteoric water, such as may be obtained from old glacier ice. This revived Willi Dansgaard interest in Greenland and prompted the collection of ice samples through cooperation with the EGIG expedition crossing the Greenland Ice Sheet and other sources.

In 1964 the US Army CRREL subsurface military research station at Camp Century on the Greenland Ice Sheet offered another research opportunity, this time to investigate radiogenic dating with silicon-32. Deep ice coring was also taking place at Camp Century and an ice core reaching the bedrock was drilled in 1966. Willi Dansgaard in cooperation with Chester Langway at CRREL measured a detailed stable isotope profile of the

entire ice core: in the same way as WMO-IAEA samples provided the global scale for present water circulation, the Camp Century ice core provided a picture of Arctic climate reaching back in time to the last glaciation and farther back, covering "one thousand centuries of climate record", as in the title of their Science paper in 1969. Again in cooperation with Langway and CRREL, Willi Dansgaard and his group analyzed the ice core from Byrd Station in West Antarctica, showing that inter-hemispheric time markers allowed harmonizing the time scales of both ice cores and discovering that abrupt climate change has occurred in the past climate history.

In 1972 Willi Dansgaard became Director of the Geophysical Isotopes Laboratory at the University of Copenhagen, leading a growing group of scientist and laboratory staff. The same year the US-Danish-Swiss Greenland Ice Sheet Program (GISP) was established. This resulted between 1978 and 1981, after years of investigations to identify a suitable site, in the Dye 3 ice core drilled and analyzed under the leadership of Willi Dansgaard, Chester Langley and Hans Oeschger. Among the findings from the Dye 3 core are the rapid climate fluctuations during last glaciation known as Dansgaard-Oeschger events, which likely represent the effect of large influx of meltwater on the ocean's thermohaline circulation in the North Atlantic.

Willi Dansgaard played a key role together with Hans Oeschger and other European partners in the establishment of the Greenland Icecore Project (GRIP), after continued cooperation with the US became impractical. The GRIP drilling at Summit took place between 1988 and 1992, sampling the Eem interglacial and reaching back into the second last glaciation. It confirmed that large and abrupt climate change can take place over shorter time scales, and that such events occurred several times in the climate history. In 1992 Willi Dansgaard retired from University of Copenhagen, having trained a strong research group that has now developed into the Center for Ice and Climate at the Niels Bohr Institute of the University of Copenhagen and has retained a key role in later European ice drillings in Antarctica at Dome C and Dronning Muad Land, and in the Danish-led NorthGRIP project in Greenland.

Willi Dansgaard showed what can be achieved when perseverance, experimental curiosity and scientific insight turn

a casual finding and a working hypothesis into a life-long commitment. The scientific and political impact of Willi Dansgaard's findings and the initiatives he started can not be overestimated in these times of heated debate of human influence on climate change.

Willi Dansgaard was a member of the Royal Danish Academy of Science and Letters, the Royal Swedish Academy of Sciences, the Icelandic Academy of Sciences, and the Danish Geophysical Society. He was the recipient of the Royal

Danish Geographical Society's Hans Egede medal, the Royal Swedish Society of Geography and Anthropology's Vega medal, the Tyler Prize for Environmental Achievement, the International Glaciological Society's Seligman Crystal and the Royal Swedish Academy of Sciences' Crafoord Prize, among other.

Michele CITTERIO  
Geological Survey of Denmark and Greenland

***Prof. Dr. ROBERT SEEMANN***  
***1945-2010***



Completely unexpected, the Austrian mineralogist and speleologist Robert Seemann passed away due to a cerebral hemorrhage shortly before Christmas, on the 20th of December 2010.

Robert Seemann was born in Vienna (Austria) on the 12<sup>th</sup> of July 1945. He studied physics and chemistry and finished with a PhD in mineralogy and petrography at the University of Vienna in 1974 on the genesis of pyrites from the karst of the Northern Calcareous Alps. He had already started working at the Natural History Museum in Vienna in 1971 and in 2004 he became appointed director of the Department of Mineralogy and Petrology. He passed away two weeks before his retirement.

Robert was an enthusiast speleologist and became a member of the Speleological Association of Vienna and Lower

Austria in 1966. He joined numerous expeditions mainly to caves in the Dachstein-Massif for the exploration of new passages and for scientific work. To mention just some of his other projects: For more than 15 years he investigated the epidote-site at the famous Knappenwand near Großvenediger in Salzburg. In Greece he worked in a cave hosting remains of dwarf elephants on the island of Tilos as well as in the Alistrati Cave in Greek Macedonia. His last major project was the development of the Al Hoota Cave in Oman as a show cave, a project accompanied by miscellaneous scientific studies.

Robert Seemann cooperated at an international level and wrote some 180 publications. His sudden death will not only leave a big gap in the scientific community as he was *the* Austrian specialist for cave minerals, but many people lost a good friend as well, a cave comrade and a great character.

Dr. Lukas PLAN (Natural History Museum, Vienna)  
(Photo Heinz Holzmann)