INTERNATIONAL SCHOOL FOR GEOSCIENCE RESOURCES (IS-Geo)
KOREA INSTITUTE OF GEOSCIENCE AND MINERAL RESOURCES (KIGAM)

PUBLIC CUSTOMIZED TRAINING COURSE ON
Paleoceanography & Paleoclimate

The **International School for Geoscience Resources** of KIGAM presents an intensive training course on **Paleoceanography & Paleoclimate**. The course will take place at the Mirinae room of International School for Geoscience Resources of KIGAM in Daejeon (Korea) in **May 28 to 29, 2015** and will include the following topics.

Topics	Date	Instructor
Day 1. Carbon isotopes and the carbon cycle Topic 1. Towards a history of the global carbon cycle Topic 2. Carbon isotopes and the carbon cycle in earth history Topic 3. Carbon cycle in the geological past – Orbital change, methane bursts and large Igneous Provinces Topic 4. Chemostratigraphy –the value of stable isotopes	May 28	Helmut Weissert (ETH Zürich, Switzerland)
Day 2. Deep-Sea Sediments–archives of climate and ocean history Topic 1. Deep Sea/Pelagic Sediments – archives for ocean and climate history Topic 2. Deep sea environments today - deep sea sediments through time Topic 3. Early Cretaceous paleoceanography, black shales, condensed sediments and sedimentary gaps Topic 4. Oceans and climate of the past –lessons for the future?	May 29	

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Ministry of Science, ICT and Future Planning

COURSE INFORMATION

Agenda

This course will provide an introduction to aspects of paleoceanography and paleoclimatology. 2 major themes will be focus of this course: a) Deep Sea Sedimentology and b) the global carbon cycle from a geological perspective. Students will learn about the use of proxies in earth system history, they will be able to read carbon isotope records and they will understand the importance of deep-sea sediments of archives for ocean history at geological time scales.

Course Covered

- Day 1 starts with an introductory lecture on the global carbon cycle and on the discovery of the importance of the carbon cycle in climate and paleoclimate research.
- Day 2 will start with a lecture on deep-sea sediments in geological research, on the discovery of deep-sea sediments in mountain ranges and on major questions in paleoceanography in the 21st century.

Course Requirements: Prerequisite

- Understanding of basics in sedimentology, stratigraphy, marine geology and isotope geochemistry
- Understanding of English as course language

Who should Attend?

- This course is designed for Master- and PhD-students, and professionals in Earth Sciences

- ## Summary of topic contents and learning objectives

Overview lecture of Day 1 is followed by focused lectures on specific topics, including an introduction into aspects of carbon and oxygen isotope geochemistry, a presentation on chemostratigraphy and one on tracing the carbon cycle through time, using C-isotope geochemistry as a tool. Day 2 will stat with an overview lecture on pelagic sediments –archives of climate and ocean history. Follow-up lectures will focus on aspects of modern deep-sea sedimentation and on the importance of sedimentological proxies in marine geology. Cretaceous Oceans with their oceanic anoxic events will serve as a case study of an integrated ocean and climate history.

- ## Day 1. Towards a history of the global carbon cycle

Students will learn that carbon cycle research started more than 100 years ago and that environmental pressure starting in the 1950ties and the development of new tools in the 1960ties and 70 ties facilitated modern carbon cycle research in earth sciences.

- C-isotope composition in marine carbonates serves as a tracer of the global **carbon cycle** through time. And it serves as an important tool in **chemostratigraphy**. Carbon cycle in earth history is controlled by orbital change, by perturbations of carbon cycle triggered by methane bursts or by volcanic activity. Modern day carbon cycle is perturbed by anthropogenic influence.

- ## Day 2. Deep-Sea Sediments –archives of climate and ocean history

The earliest investigations of modern deep-sea sediments date back into the late 19th century. Sediments were sampled from all the major oceans during the Challenger expedition (1872-1876). One of the results of these early investigations was the identification of the Calcite Compensation Depth, the CCD. In the presentation, the CCD will be used as a guide through ocean and climate history of the last 120 million years. Extraordinary changes of the CCD at the Eocene-Oligocene transition, at the Paleocene-Eocene Thermal Maximum and during Oceanic Anoxic Event 1 in the Aptian provide insight into major changes of the climate-ocean system and, hence, of the biosphere. The Aptian case study offers the opportunity to learn about feedbacks between plate tectonics, physical, chemical and biological oceanography at times of perturbations of the global carbon cycle resulting in greenhouse pulses.

- An understanding of modern **deep-sea sedimentology** serves as starting point for the deciphering of sedimentary features in fossil deep-sea sediments

- **Black shales** and **Oceanic Anoxic Events** characterize Cretaceous Oceans. An investigation of these Events in earth history provides insight into coupling of C-cycle history and paleoceanography.
- A discussion on oceans and **climate of the past –lessons for the future?** will conclude the lectures

About the instructor – *Professor Helmut Weissert*

Prof. Helmut Weissert is a professor of ETH Zürich, Switzerland. He achieved Ph. D. in in paleoceanography from ETH Zürich in 1979. He worked as a Post doctor at university of Southern California, Los Angeles (1979-1980). And also, he worked as a research associate of department of earth sciences, Basel university, Switzerland (1981-1982). He gave a lecture at ETH Zürich, Università di Milano (Italy) and Fribourg University (Switzerland) before he joined as a professor to ETH Zürich in 1992.

✓ **Other professional activities**

-President of the Swiss Geological Commission (1994-2004)
-President "Platform Geosciences" ScNAT (2007-2010)
-Member of executive board, ScNAT, 2011-
-Vice Chair ISSC (International Subcommission on Stratigraphic Correlation)
-Member of the Editorial Board of numerous Scientific journals
-Member of advisory panels DFG (Ocean Drilling Programme); NERC (GB),
-Member of Review Panel 2009 of the DFG Research Center 15 (Marum, Bremen)
-Member of Review Panel, Croatian Institute of Geology: 2013

✓ **Awards**

2005 "golden owl" Prize for best Teacher of Earth Sciences ETH
2013 Jean-Baptiste Lamarck Medal, European Union of Geosciences
2010-2012 Distinguished Lecturer, ESSAC, IODP
2014 "golden Owl" Prize for best teacher of Earth Sciences ETH
2014-2015 Distinguished Lecturer, International Association of Sedimentologists

✓ **Publications**

Author and co-author of more than 120 scientific publications. Citation Index (Scholar): 5400; H-index: 40

Editor of and author of several books on Paleoceanography, Stratigraphy and on Geology of Switzerland