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## A gift from the Earth

While many people have come to know that the rise of carbon dioxide (CO<sub>2</sub>) concentration in the atmosphere is a major culprit of the global warming and climatic changes, there seem to be few who know that CO<sub>2</sub> concentrations have repeated significant fluctuations at a cycle of tens of thousands years over the past 700,000 years. Clathrate hydrates, the research theme of Associate Prof. Ohmura, hold the key to the study of past climatic changes.

By now, CO<sub>2</sub> concentration data for the past 720,000 years have been databased, of which actually measured data are for

only tens of years. The remainder has been obtained by boring and analyzing ice sheets in Antarctica and Greenland. Therefore, ice sheets from deep underground are necessary to investigate the composition of the atmosphere of ancient times.

Down to a depth of about 800 meters, air contained in ice sheets exists as bubbles floating with ice, but further down, air reacts with water in the ice to become crystals surrounded by water molecules. In other words, air becomes hydrated. This is because, in a low-temperature, high-pressure environment as seen in depths greater than 800 meters, air contained in ice can be stable as air hydrates rather than existing as bubbles.

Furthermore, these air hydrates have the same structure as methane hydrates, making it possible to confine air within crystals just as it was like back then. It's interesting to know that ancient ice sheets became the ideal place to preserve air from 700,000 years ago.

Ice sheets in Antarctica are believed to have been formed by the coldness and snow that has fallen over tens of millions of years. The air back then first existed as bubbles in ice sheets for some time, and then went to sleep for countless years with air hydrates as its cradle. Given this, it's wondrous to assume that ice sheets bored from great depths are time capsules prepared by the Earth to convey the state of ancient times to our modern times.

## Science and Technology Information

### The 12th KLL Industry-Academia Collaboration Seminar “Resilient Community: the Ways to Realize It”

Date: October 28 (Fri.), 2011 15:00 ~ 17:30

Place: 1st floor symposium space, Raiosha Bldg. on Keio Hiyoshi Campus

Admission free; Prior applications required

<http://www.kll.keio.ac.jp/seminar/index.html>

Following the seminar, there will be an opinion exchange meeting. Please apply for participation via the above URL.

### The 12th KEIO TECHNO-MALL 2011 “Let's get started”

Date: December 9 (Fri.), 2011 10:00 ~ 18:00

Tokyo International Forum (Exhibition Hall 2, E Block B2)

Admission free, no prior registration required

<http://www.kll.keio.ac.jp/ktm/index.html>

The KEIO TECHNO-MALL, organized by KLL, is an annual exhibition of science and technology. For this year, the closing time will be extended to 18:00. The exhibition hall to be used will be changed from the previous year.

### Strategic Management Chair for Creating Innovations (a Sony-donated chair) Open Symposium 2011 “Toward a New Phase of Development of Humankind and the Future”

2nd seminar: “The Internet and the Future of Mankind” November 24, 2011 (Thur.)

3rd seminar: “How Far is the Future Predictable?” January 27, 2012 (Fri.)

<http://www.koukai-sympo.net/portal/>

Details of these events will be uploaded successively on the above URL.



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### Editor's postscript

On a certain day in August, Associate Prof. Ohmura appeared to make preliminary arrangements for the interview and data gathering for this issue, wearing an aloha shirt (which suited him very well). Judging from his appearance, I expected that he would accept our request open-mindedly. But I became upset when I heard him say, “I’m an old type of researcher who thinks that researchers should be okay only if they produce good results and publicize them through articles.” In the actual interview, however, he was so cooperative as to talk a lot about the romantic side of research activities, and even demonstrated a 95kg bench press for us. By the way, we used “the color of the Mediterranean sky” for the front cover background in response to Dr. Ohmura’s request (this indicates he is a great romanticist!).

What’s more, he likes to wear a necktie featuring a design of a frog (“kaeru” in Japanese which also means “return home”) when taking a business trip. His wife chose this tie expecting him to return home safely! Our interview was rewarded with one delightful surprise after another about his personality.

(Saori Taira)

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