

Facilities are Enhancing Research Quality

One of the key elements of the internationally lauded accomplishments of our researchers is the university's state-of-the-art laboratories and research facilities.

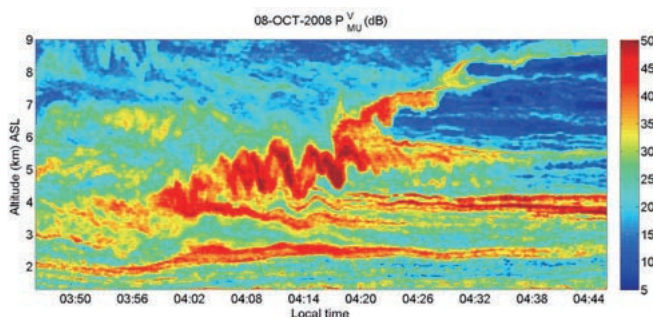
METEOROLOGY

MU Radar Observations Atmospheric Turbulence 23

In collaboration with a French research group, we conducted an extensive study on the small-scale dynamics of the lower atmosphere. The study aims to characterize atmospheric turbulence, its sources and its interactions with large-scale dynamics and clouds by means of remote sensing and in situ observations.

The Middle and Upper atmosphere (MU) radar of the Research Institute for Sustainable Humanosphere (RISH) is one of the most suitable instruments for detecting turbulence and stable interfaces throughout the entire troposphere at any time, irrespective of clear or cloudy conditions. In turbulence observations, excellent spatial and temporal resolutions can be achieved through a range-imaging technique using frequency diversity.

In recent years, all the measurement campaigns have involved the MU radar in range-imaging mode with complementary instruments (e.g. radiosondes, Rayleigh-Mie lidars, ultra high frequency [UHF] and meteorological radars) for validating the technique in turbulence studies. The bottom figure shows an example of a time-height cross section of echo power obtained using the MU radar in range-imaging mode on 8 October 2008. We found Kelvin-Helmholtz (KH) braided-like structures along the slope of a cloud base gradually rising with time at an altitude of approximately 5 km, and vertical air motion oscillations exceeding ± 3 m/s with a period of approximately 3 min above and below the cloud base.



From the Editor The MU radar has been presented with an IEEE Milestone by the Institute of Electrical and Electronics Engineers (IEEE), the world's largest academic society. The award ceremony took place on 13 May 2015 at Kyoto University.

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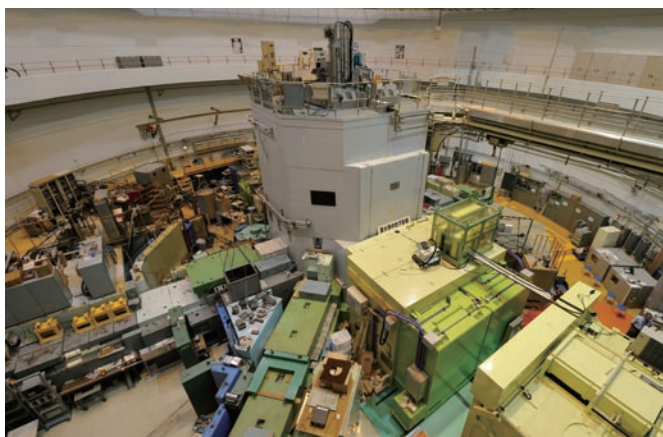
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WEB www.rish.kyoto-u.ac.jp/



KURRI Promotes the Next Generation of Cancer Treatment

A new center to be established in 2019 will aim to enhance the Institute's collaborative activities on the Boron Neutron Capture Therapy for Cancer Treatment. 68



To promote the practical use of Boron Neutron Capture Therapy (BNCT), a joint-use medical center tentatively named the Kansai BNCT Medical Research Center is scheduled to be established in Osaka in 2019. The new facility will promote collaborative research between hospitals and universities, including Osaka Medical College, Kyoto University Research Reactor Institute, Osaka Prefecture University, and Osaka University.

BNCT is a form of radiotherapy that selectively destroys cancer cells through the administration of boron compounds which accumulate in cancer cells,

irradiating the cancerous region with neutrons. The treatment uses heavy particle beams generated by the nuclear reaction of boron and neutron that travel only the distance of one cell's diameter. BNCT can selectively destroy cancer cells with little damage to adjacent healthy cells, and shows promise for the next generation of cancer treatment as it is anticipated that it can be used for cancers which have been difficult to treat with conventional radiotherapies.

As of May 2014, the Kyoto University Research Reactor Institute (KURRI) had administered 510 BNCT treatments for target cancers including malignant brain tumors and head and neck cancers using neutrons produced by the Kyoto University Research Reactor. BNCT clinical studies using reactor neutron sources have shown that, as a new radiotherapy modality, BNCT can be effective for the treatment of locally recurrent tumors after radiation therapy. Such tumors have been difficult to treat with conventional radiotherapies. To facilitate the wider use of BNCT, KURRI has successfully developed a BNCT irradiation system using small-scale accelerator-driven neutron sources which can be installed in existing hospitals. The institute began

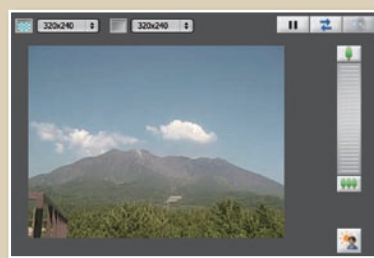


Kyoto University Webcams

Kyoto University Webcams are installed at a number of the university's campuses and facilities. Members of the general public can view live streaming images of the locations listed below.

Viewable Sites

- Hida Observatory, Gifu
- Primate Research Institute (KUPRI), Aichi
- Research Reactor Institute (KURRI), Osaka
- Shirahama Oceanographic Observatory, Wakayama
- Sakurajima Volcano Research Center, Kagoshima
- Tokyo Office, Tokyo
- Yoshida Campus, Uji Campus, and Katsura Campus, Kyoto



View from the Sakurajima Volcano Research Center

WEB www.kyoto-u.ac.jp/en/about/profile/campus_scenery/webcams.html



clinical trials of BNCT for recurrent malignant brain tumors in 2012, and for head and neck cancers in 2014. The establishment of the new joint research center will enhance collaboration with Osaka Prefecture University, promoting boron compound research and development, and also with Osaka University, which has advanced capabilities in PET examination. Such collaboration will accelerate efforts toward the practical use of BNCT.



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WEB www.rri.kyoto-u.ac.jp/BNCT/



PRIMATOL >>

In the WISH Cage and the Research Resource Station, Chimpanzees are Moving and Foraging Freely ²⁰



The Primate Research Institute, Kyoto University (KUPRI) was established in 1967 and has for the past five decades been promoting basic research on primates including humans.

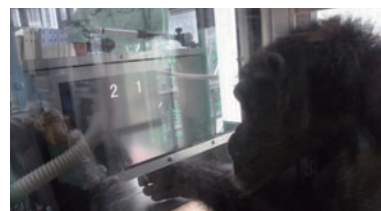
WISH Cage

At the KUPRI, 2 cages, called “WISH (Web for the Integrated Studies of the Human Mind) Cage(s)”, have been constructed. The WISH cages have a space of 20 m² that are fifteen meters high*. Because of the facility, the chimpanzees at the KUPRI have been living more of a natural style from the academic year of 2011.

*The setup financially supported by Japan Society for the Promotion of Science.

Although wild chimpanzees often live in large, fifteen to one hundred or even more member groups, not every member facing at each other all the time. In the aim to simulate the life style of wild chimpanzees, fission-fusion emulation was made possible by connecting the WISH cages and the outdoor enclosure for our chimpanzees at KUPRI. With this setup individual chimpanzees can freely choose their “habitat” (cage/enclosure) and be with several group members (or stay alone if they prefer) at any given time, like chimpanzees in the wild.

A computer-operated system set up in the WISH cages enables ad libitum feeding. Any one chimpanzee of the group can come to any of the several touch-screen monitors at any preferred time and operate the computers at their will. Thus, they can obtain food rewards by doing a cognitive task at any time of the day during the 24 hour period. Using the automated face recognition system, we can automatically run personalized tasks for every chimpanzee. Additionally we can keep and accumulate record logs of all chimpanzees’ tasks automatically. There is also WISH Cage at Kumamoto Sanctuary, Wildlife Research Center, in Kumamoto Prefecture (**WEB** langint.pri.kyoto-u.ac.jp/ai/en/kumamoto-sanctuary.html).



Research Resource Station

In 2006, the KUPRI also set up ten hectares facility to keep Japanese monkeys in an environment close to their natural habitat, and elucidate their behavioral characteristics. It is named Research Resource Station (RRS) and located about 2 km east of the KUPRI, Inuyama, Japan.

The institute contributes to National Bio-Resource Project (NBRP)[†] “Nihonzaru,” supported by Ministry of Education, Culture, Sports, Science and Technology (MEXT), which provides purpose-bred Japanese monkeys to research institutes all over Japan.

[†]The jurisdiction was transferred to Japan Agency for Medical Research and Development (AMED) from MEXT 2015.

The RRS staffs keep trying to improve monkeys' welfare in captivity, providing various types of enrichment to encourage their natural behavior, such as climbing, leaping, resting, foraging and social interactions.



Monkeys in the enclosure



From the Editor Via following URL or QR code, you can meet the chimpanzees at KUPRI. <https://www.youtube.com/user/TheFriendsAndAi> (You Tube)



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WEB langint.pri.kyoto-u.ac.jp/ai/en/about/facility.html (KUPRI)

WEB www.pri.kyoto-u.ac.jp/sections/chemr/index.html (RRS)



Shirahama Aquarium 31

Shirahama Aquarium opened to the public in 1930 as a part of the marine biological laboratory. One of the few university-operated aquariums in Japan, it features exhibits of invertebrates and fish found in the Nanki Shirahama area. The aquarium holds one of the largest invertebrate collections in Japan, with over 500 species on display throughout the year.

WEB www.seto.kyoto-u.ac.jp/aquarium/aquarium-E-top.html

