Establishment of a Virtual Core Library

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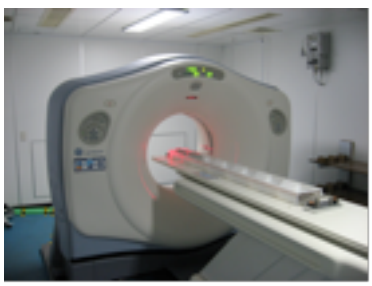
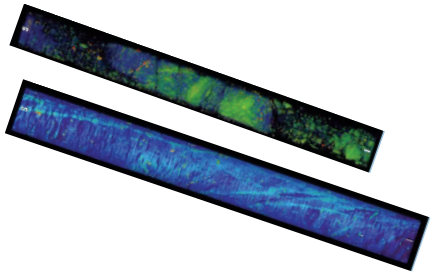
One of the important goals of the current IODP 'Initial Science Plan' is to understand physical properties of the material of the earth subsurface by extracting cores from the fault zones in the seafloor. The cores obtained from the recently concluded NanTroSEIZE Stage 1A expeditions provide useful information to meet this goal. The most important and holistic view of the relevant cores from the fault zone is obtained on board ship soon after recovery by scanning the cores with the X-ray CT scanner (XCT), a medical equipment adapted to investigate the cores nondestructively. Prior to the scanning the 9.5 m long core is sectioned into 1.5 m long pieces, so that it can be handled easily inside the laboratory. The XCT scanning of one such core section produces about 1 gigabyte raw data. This data file is utilized by a software to produce various 2-D images of the core section, and each of such image can be about 100 kb at low resolution. Handling the smaller data file (100 kb) on a computer as well as on the internet is an advantage in itself, however, for specialists (e.g., structural geologist and those studying physical property), the images can be very unsatisfying, especially because they are more interested in having a 3-D view of the faults/fractures in the core section than plain 2-D images, and in estimation of density variation for understanding the material and structures. The raw data of each core section can be utilized by various softwares to produce useful 3-D images, however, large file size of the raw data limits the data handling, and it is required to either focus on certain specific part of a section or create a facility to handle large data files. Being an IODP core repository, the Kochi Core Center (KCC), Japan offers to begin a service fruitful for the structural geologists.



X-ray CT scanner onboard D/V Chikyu



False color images of core sections

Media for XCT data

data distribution

The KCC is planning to install a computing system, which will hold copies of all the XCT data obtained on board, and then handle the data requests in a way similar to the usual sample requests to provide appropriate data to the requesting structural geologists. Moreover, the archive halves of the Legacy cores (DSDP and ODP cores) at the KCC will also be scanned in near future by using the XCT available at the KCC. This is a logical function for a core repository that it will hold the actual cores as well as their 3-D image related data. The samples are taken from core sections in the course of time and actual material may disappear after a few years. However, by keeping the 3-D data and providing it to the data requesters, will be an unending service to be offered by the KCC. To provide this service, the KCC will be equipped with fast speed computing facility and trained staff to handle large size of raw data files to generate 3-D images and then extract the required data and copy it on a physical media (DVD or blue ray disc) in order to supply it to the data requesters around the world.