Japan Geoscience Union Meeting 2012
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STT59-P01 Room:Convention Hall Time:May 21 15:30-17:00

An experiment of seismic waveform recording by using ready-made IC recorders

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In order to conduct a high-density seismic observation for analyses of focal mechanisms and coda waves, we present a very-low-price recording system for high-frequency seismic waveforms. The system consists of a geophone with a vertical component and a ready-made IC recorder. The purpose of this study is to show that the IC recorder is able to record seismic waveforms with a frequency lower than the voice band from 60 to 3400 Hz. We compare two IC recorders: Voice-Trek V-75 (OLYMPUS) and ICD-UX512 (SONY). The price of ICD-UX512 is about 10,000 yen. We use a geophone (CDJ-Z10) made in China with a natural frequency of 10 Hz and a sensitivity of 2.8 V/cm/s. The price of CDJ-Z10 is about 10,000 yen. As a result of recording tests, we find that the two IC recorders are able to record waveforms from local micro-earthquakes with a frequency of around 10 Hz.

Keywords: IC recorder, seismic observation, seismometer, datalogger

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STT59-P02 Room:Convention Hall Time:May 21 15:30-17:00

Compact and highly sensitive tiltmeter 2

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R&D status of a compact and highly sensitive tiltmeter and results of test observation taken with a prototype instrument located in a shallow borehole will be presented.

Keywords: tiltmeter, folded pendulum, optical transducer, ocean bottom, borehole

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STT59-P03 Room:Convention Hall Time:May 21 15:30-17:00

Beginning of automatic Wphase analysis and Improvements of automatic CMT analysis in JMA

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JMA operate auto-CMT analysis using STS-1 and STS-2 seismometers. However, when "The 2011 off the Pacific coast of Tohoku Earthquake" was occur, auto-CMT analysis did not work, Because almost all domestic seismometers ware clipped.

For this problem, JMA has taken the following measures.
(1) Using velocity type strong-motion seismograph in auto-CMT analysis.
(2) Beginning of auto-Wphase* analysis.
*Wphase is long period body wave.
In the poster, we will present their methods and results.

Additionally, when the centorid location is far from the epicenter (used as the initial value of the analysis), the result of auto-CMT analysis is not good. So we are developing grid search method to obtain the appropriate initial value.

Keywords: Wphase analysis, CMT analysis, mechanism analysis, moment magnitude, automatic processing

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STT59-P04 Room:Convention Hall Time:May 21 15:30-17:00

Crustal deformation data is available via WWW server in real-time

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We started to operate real-time crustal deformation data exchange system between institutions concerned. You can access strain, tilt, barometric pressure, groundwater, gravity, and seismogram data. This system can accept any kind of time-series data including above examples. Only IP connection with a free port is required to send data to our system. Please access to following address, and pass your comments to us for improvements. Any data which can join our system are welcome.

http://crust-db.sci.hokudai.ac.jp/db/login.php

You can access this from anywhere in the world with internet connection and web browsers. ID and password will be issued after your application via above web site. Data is basically open for researchers, and no permission is required for personal use, for example, watching and temporal preliminary analysis. If users try to make public presentation, analysis and/or publication, they should apply to get permission for data usage to institutions which have responsibility for station operation and data production.

Data format is win-packet (Urabe, 1992). JDXnet (Takano et al., 2005), which have been stably used for nationwide real-time seismic waveform data exchange, is also used for our system. Users who have direct connection to JDXnet can receive packet data in real-time using channel-table information. We also offer a unified crustal deformation database system (Yamaguchi et al., 2010) to users who have no direct connection to JDXnet. This database is collecting and storing all exchanging data in real-time, and provides following functions; drawing on any time and sensitivity windows, filtering of high-pass, low-pass and band-pass window (Saito, 1985), tidal and trend analysis using Baytap-G (Tamura et al., 1991), strain analysis, streaming strain analysis (Okubo, 2005), detrending and auto-zero, cumulative amplitude of long duration seismogram, fault mechanisms information archive based on Global-CMT and JMA catalogues.

Strain sensors have follow advantages; having linear response from several Hz to DC component, records represent physical value directly, do not require instrumental response correction operation, no mechanical saturation, and having ultra-high sensitivity. These positive facts suggest real-time operation is preferable than GPS or broadband seismographs which require lead time for pre-analysis and deconvolution.

Real-time Mw estimation is required for effective tsunami warning for Mw>8.5 mega earthquakes and tsunamigenic slow earthquakes. The 2011 Tohoku earthquake revealed current magnitude estimations, including earthquake early warning system, are not proper. Near-field strain seismograms, which contain transient static strain change and dynamic strain waveform, represent strain release due to faulting directly. We are challenging to apply our nationwide strain observation network data to real-time Mw estimation especially for Mw>8.5 mega-events for robust quantitative tsunami warning.

Keywords: Crustal defornation data, Strain meter, Tilt meter, Real-time data exchange, Data open for researchers

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STT59-P05 Room:Convention Hall Time:May 21 15:30-17:00

Broadband seismic observation on the Greenland ice sheet

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The GreenLand Ice Sheet monitoring Network (GLISN) is a new, international, broadband seismic capability for Greenland being implemented through the collaboration of Denmark, Canada, France, Germany, Italy, Japan, Norway, Poland, Switzerland, and USA. Glacial earthquakes have been observed along the edges of Greenland with strong seasonality and increasing frequency since 2002 (Ekstrom et al, 2003, 2006) by continuously monitoring data from the Global Seismographic Network (GSN). These glacial earthquakes in the magnitude range 4.6-5.1 may be modeled as a large glacial ice mass sliding downhill several meters on its basal surface over duration of 30 to 60 seconds. The detection, enumeration, and characterization of smaller glacial earthquakes are limited by the propagation distance to globally distributed seismic stations, i.e., the Global Seismographic Network (GSN) with the International Federation of Digital Seismograph Networks (FDSN). Glacial earthquakes have been observed at seismic stations within Greenland (Larsen et al, 2006), but the current coverage is very sparse. In order to define the fine structure and detailed mechanisms of glacial earthquakes within the Greenland Ice Sheet, a broadband, real-time seismic network needs to be installed throughout Greenland's Ice Sheet and perimeter. National Institute for Polar Research and Japan Agency for Marine-Earth Science and Technology are members of GLISN project. We have installed the ice sheet station, called ICE-S, in 2011 in collaboration with IRIS PASCAL project. The station equipped with CMG-3T broadband seismometer and Quanterra Q380 data logger. We will introduce a settlement of broadband seismometer on the ice and data transmission from the mid of Greenland ice sheet.

Keywords: icequake, broadband seismic observation, GLISN