Contents of the Program *(January 19th to March 15th, 2014)*

Output	Subject	Lecture/Exercise	Contents	Methodology
To acquire knowledge of the CTBT regime and the role of seismology in the International Monitoring System (IMS)	CTBT & IMS	Introduction of CTBT Regime concerning seismology	Review of verification of nuclear tests and seismology. Explanation of present status and future plan of CTBT concerning seismology	Lecture
		Characteristics and Progress Status of the International Monitoring System of the CTBT Organization (CTBTO)	Four different technologies form the basis used by IMS to verify compliance with CTBT. The characteristics and status of implementation of each of the networks -Seismic, Hydroacoustic, Infrasound and Radionuclide- with emphasis on the primary and auxiliary seismic networks will be presented.	Lecture
To understand global seismological observation technologies for monitoring nuclear tests and earthquakes	Seismological Observation	Seismometer I & II	Basic theory of electro-magnetic seismometer and specific explanation for some broad band seismographs.	Lecture and Practice
		Seismic Network	Data acquisition and telemetry systems are overviewed.	Lecture
		Design of Seismic Network I & II	General guidelines for designing seismic network are given on the first day. Participants will then make a plan to upgrade the seismic network of their countries during the training course to make a presentation on the last day.	Lecture and Presentation
		Noise survey and site selection I & II	Practice in measurement of ground tremor will be given with short-period sensors and a broadband sensor.	Lecture and Practice
	National Data Center	Auto Data Request Manager	The auxiliary stations under IMS network should send seismograms by e-mail upon request from IDC. To realize this data transmission automatically, it is required to install Auto Data Request Manager (AutoDRM) at stations or National Data Center. In this lecture, we will review the Swiss 8AutoDRM system, which has	Lecture

			been widely used around the world since GSETT-3. The lecture includes the installation and maintenance of this AutoDRM system.	
		National Data Center (NDC)	System and operation in National Data Center (NDC) will be introduced.	Lecture
To acquire data analytical techniques to discriminate nuclear tests from natural earthquakes	Data Processing	Retrieval of Digital Seismic Data and Disposal of Format	Practice of data retrieval and plotting seismograms will be given. Then basic theory and practice of data processing used frequently in the field of global seismology will be given. Participants will practice using broad and short-period seismograms of nuclear explosions and earthquakes.	Lecture and Practice
		Spectral Analysis		
		Digital Filter		
	Data Analysis	Introduction to UNIX	The essentials and basic commands of UNIX will be explained.	Lecture and Practice
		Analysis of Teleseismic waves	Explanation of principles underlying the interpretation of seismograms reading practice	Lecture and Practice
		Hypocenter Location	A method for determining a hypocenter of a teleseismic event will be explained as well as that of a local one. Practice of the hypocenter determination will be given using PC.	Lecture and Practice
		Source Mechanism	The purpose of this lecture is to provide participants with necessary basic knowledge for determination of focal mechanism by seismic wave analysis. It includes a manual P-wave first motion method and moment tensor inversion.	Lecture and Practice
		Seismic Array Data Analysis	Objectives and history of seismic arrays Signal and noise in space and time Arrival time analysis Beamforming in time domain Frequency-wavenumber power spectrum Resolution Spatial sampling	Lecture

			Design of an array station	
		Observation and Practice of Seismic Array	Introduction of Matsushiro Seismological Observatory Visit to a satellite station of MSAS (Matsushiro Seismic Array System) Practice: Analysis of seismograms obtained by MSAS	Lecture and Practice
		Analysis using GEOTOOL	Practice of analyzing IDC waveforms using GEOTOOL software.	Lecture and Practice
		Seismicity and Tectonics	The characteristics and tectonic background of the seismicity in the world are introduced and practice on analyzing seismicity is given by using personal computer.	Lecture and Practice
	The nuclear test identifying method	Discrimination by mb-Ms	General introduction on magnitudes, practice of determination of mb and Ms, and discrimination by mb-Ms	Lecture and Practice
		Discrimination by short-period seismograms	Explanation of short period discriminants, practice of discrimination by short period discriminants	Lecture and Practice
		General discrimination technique	Practice of the screening procedure along the stream line by using all knowledge in this lecture course.	Practice
To Make an Action Plan (Project Proposal) which they should implement in their countries after returning home	Action Plan	Making Action Plan	Making Action Plan	Practice
		Presentation	Making the Presentation of the Action Plan	Presentation and Discussion