Graphical overview of the Indonesia-Japan ESSEI Project in Flores Island

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A five-year Indonesia-Japan bilateral research cooperation program, named the "Research Cooperation Project on the Exploration of Small-scale Geothermal Resources in the Eastern Part of Indonesia" (ESSEI), started in April 1997 and will end in March 2002. We here briefly overlook the ESSEI Project by graphical materials to assist readers in easier understanding of this special volume.

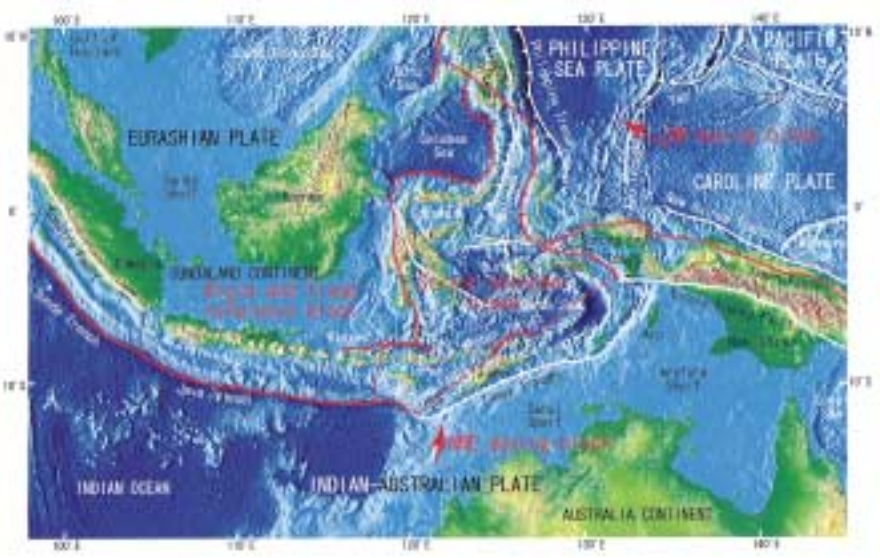

Fig. 1 Tectonic map of Lesser Sunda-Banda arc drawn on the ETOPO2 of NGDC, NOAA. Here is a place of interactions of major plates. Current GPS measurements show that Indian-Australian Plate is moving NNE and Pacific Plate is moving NW with respective to Eurasia Plate, so that the Banda arc is still bending and Flores Island is subject to the N-S trending left-lateral shear stress. This shear is a cause of the Bajawa rift zone in the study area.

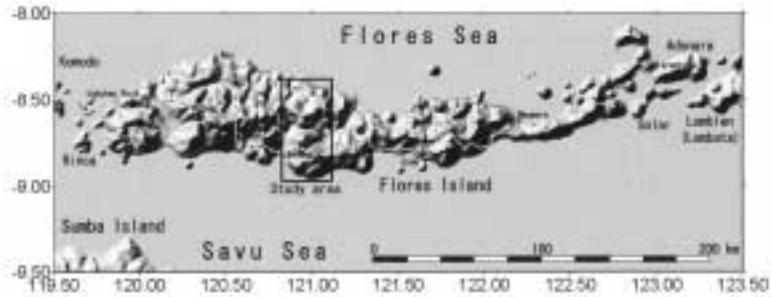

Fig. 2 Study area of the ESSEI Project in Flores Island (DEM data are from GTOPO30, USGS EROS Data Center).

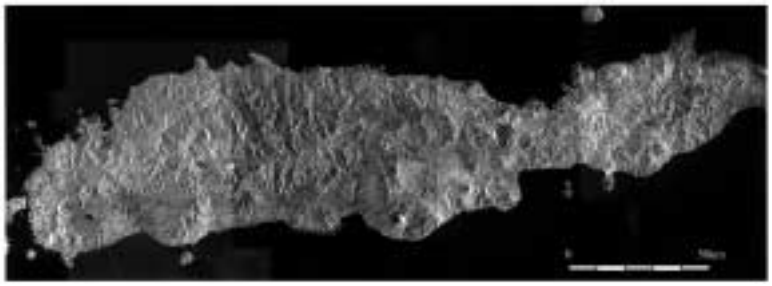

Fig. 3 SAR mosaic image of the western Flores Island (Copyright METI/NASDA).

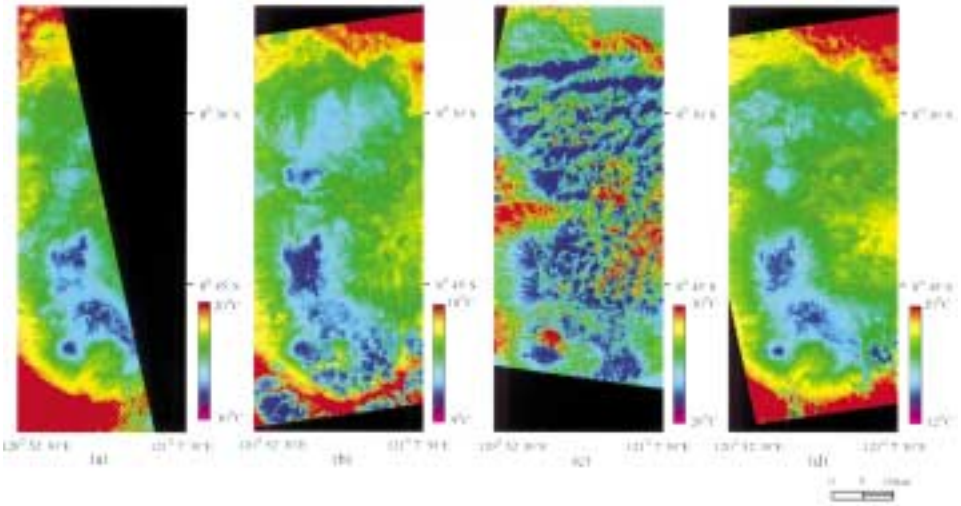

Fig. 4 Brightness temperature distribution of the study area derived from ASTER TIR band 13. (a) 14:41 UT (22:41 local time) on June 23, 2001. (b) 14:35 UT (22:35 local time) on July 2, 2001. (c) 2:30 UT (10:35 local time) on July 16, 2001. (d) 14:35 UT (22:35 local time) on July 18, 2001. Brightness temperature reflects topographic elevation and sunshine in the day time image (c), but the night time images (a), (b) and (d) show thermal manifestation. Nage steaming ground is detectable as a bright spot on the images (a), (b) and (d).

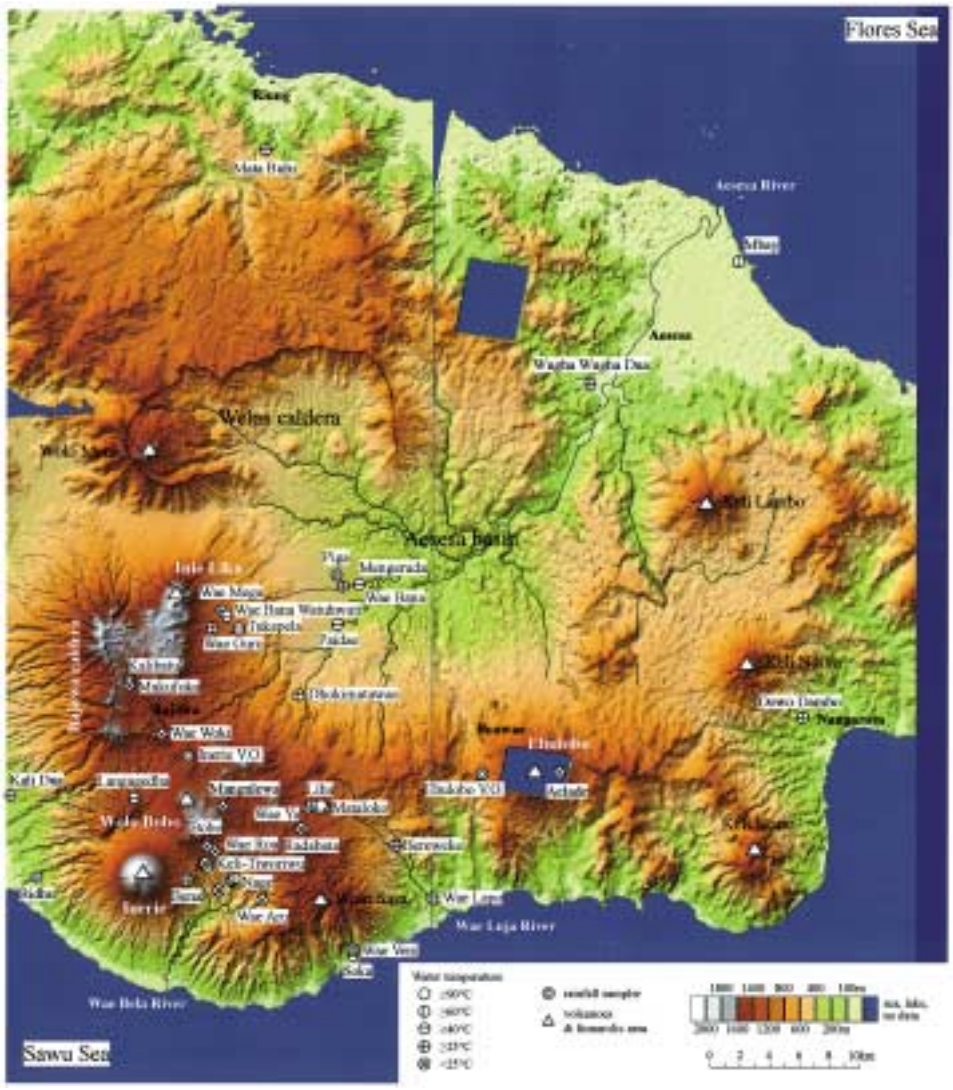

Fig. 5 Shaded relief topographic map of the Ngada District. Digital elevation data (DEM) in the western half was taken from topographic maps at a scale of 1:25,000 and those in the eastern half was processed from a stereoscopic pair of JERS-1 OPS images by Minoru Urai. Localities of major volcanoes, steaming grounds and hot springs are shown on this map.

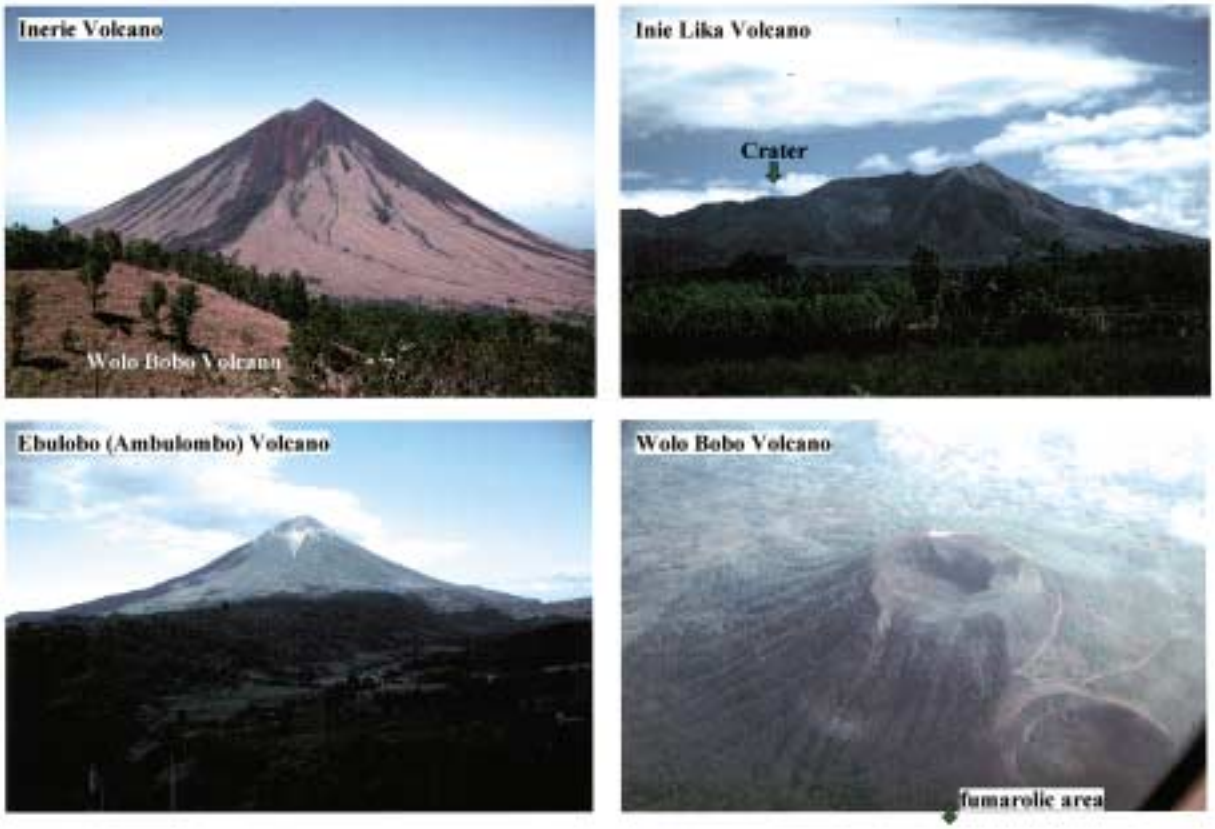

Fig. 6 Major volcanoes in and around the study area. See Fig. 5 for their localities.

Fig. 7 Major geothermal manifestations in the study area. See Fig. 5 for their localities.

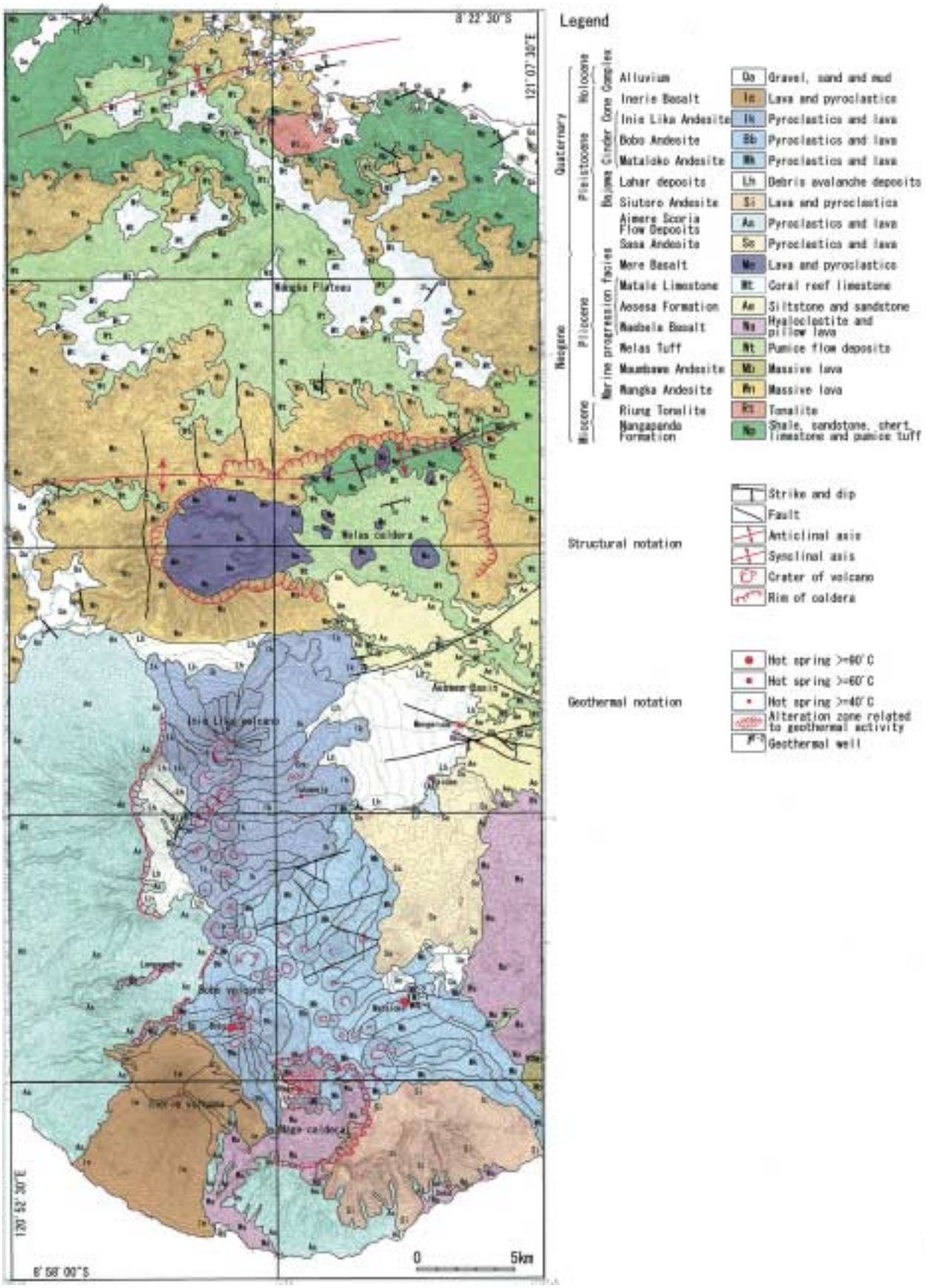

Fig. 8 Geological map of the study area.

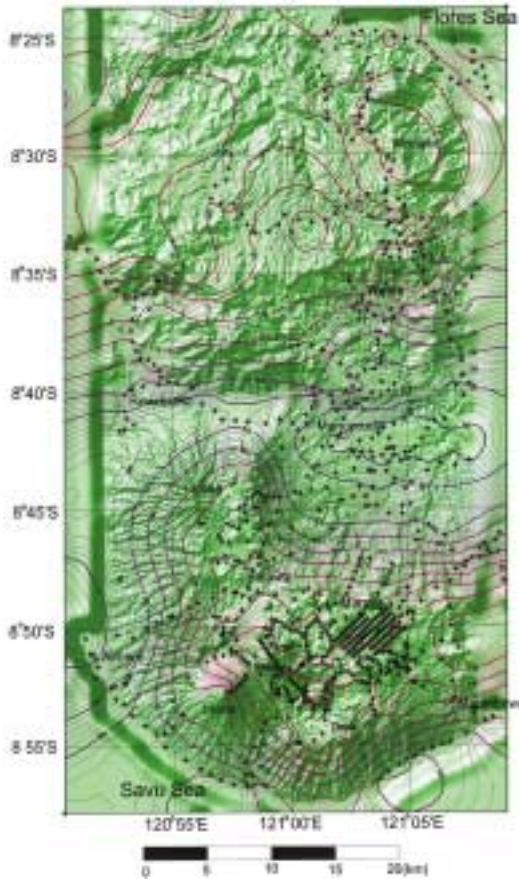

Fig. 9 Bouguer anomalies of central Flores Island with an assumed density of 2.0 g/cm^3.

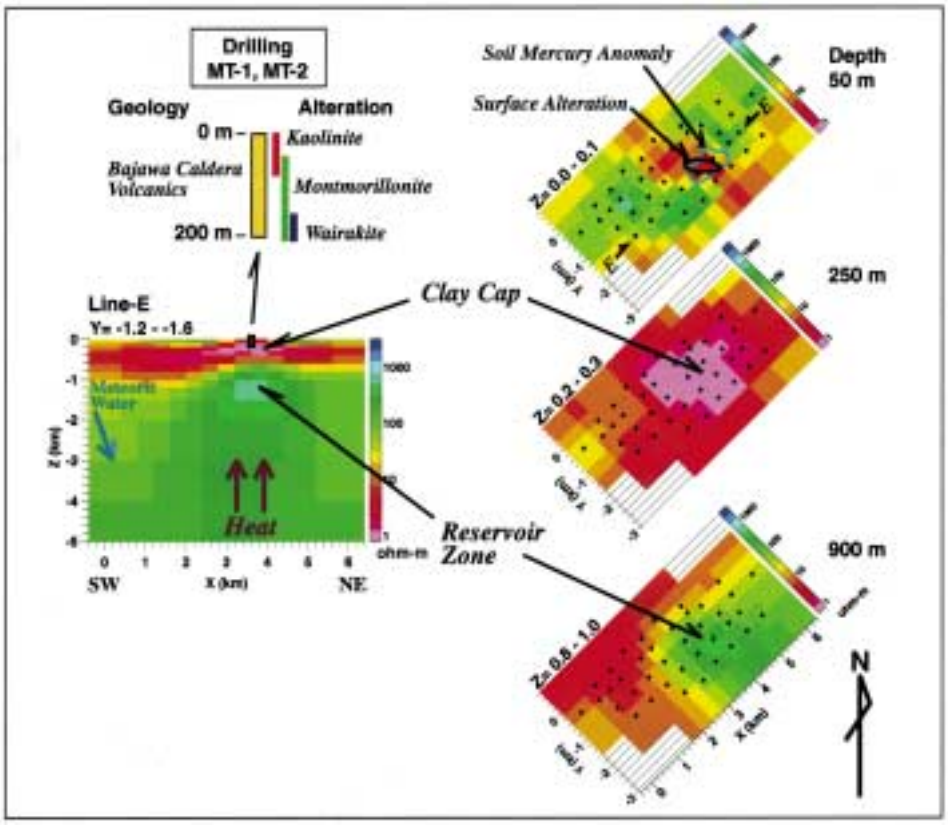

Fig.10 3-D Interpretation of magnetotelluric (MT) data at the Mataloko geothermal field. The low-resistivity layer at depths of approximately 100 - 500 m beneath the surface alteration zone corresponds to the cap layer of the reservoir system. The high-temperature reservoir seems to correlate with the high-resistivity basement below the clay cap.

Fig.11 Photograph of meeting in the Volcanological Survey of Indonesia, Bandung, for the site determination of the NEDO exploration well, March 2000.

Fig.13 Photograph of visiting delegation by a helicopter for the flow test of NEDO MT-2 well in Mataloko at January 20th, 2001. The delegation consisted of two members of Parliament, Governor of the Nusa Tenggara Timur Province, Director General of the Directorate General of Geology and Mineral Resources and Vice President of the State Electric Company (PLN). Local residents celebrated their visiting in a traditional form.

Fig.15 Photograph of the flow test of NEDO MT-2 well. It was successful. About 15 tons per hour of dry steam were stably produced at an entirely valve open state. Considering the shallower well depth of 162.35 m, the production rate is quite economical.

Fig.12 Photograph of the drilling rig of NEDO MT-2 well at Mataloko taken at January 19th, 2001. All the drilling crews were under tension for the next day's official flow test.

Fig.14 Photograph of numerous guests at the flow test site of NEDO MT-2 well. The flow test gathered not only the delegation shown in Fig. 13 but also a several hundreds of local residents even from far villages.

Fig.16 Photograph of the new fissure and steam discharge at eruption crater of Inie Lika volcano just after the phreato-magmatic eruption during January 11-16, 2001. The photograph was taken at January 22, 2001.