landform development, and even what are safe and unsafe practices by humans in relation to the landscape. Many of the "Beautiful Island’s" landforms are the result of natural and anthropogenic processes. Unique gorges, rugged hills, fluvial and marine terraces, and other coastal features give amply testimony to the fact that Taiwan is an active and dynamic island, quite similar to Japan. Deciphering the inter-relationships between form and process that results from episodic typhoons and earthquakes and continuous weathering is a major challenge to Taiwanese geomorphologists and emphasizes the continuing need for research. On this occasion, we appreciate the opportunity to share experiences with fellow geomorphologists and the possibility of examining some of Taiwan’s marvelous landforms together and to continue the search for the ‘myth’ of its geomorphic treasures.

Key words: landforms, Taiwan

Flexible Print Circuit Type Strain Probe for Monitoring of Shearing Deformation of Soil

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Flexible print circuit (FPC) was printed on a spring steel strip to make a strain probe with a sufficient number of sections to measure the shearing displacement of soil, because current strain probe cannot detect shearing displacement. In addition, a two-gauge method was adopted with a pair of strain gauges attached to both sides of a section of the steel strip. We fashioned an FPC type strain probe 48 cm in length with 12 sections (i.e., each section length 4 cm). Shearing deformation tests (shearing thickness 2, 4 and 6 cm) were conducted on the FPC type probe and the current probe (section length 10 cm). The current type could not detect any shearing displacement, whereas the FPC type could detect that of 4- and 6-cm shear-layer thickness at a 100% success ratio. In contrast, the FPC could detect only 33.3% of the shearing 2 cm in thickness. These results indicate that the FPC probe can detect shearing displacement when a section length is equivalent to or smaller than the shearing layer thickness; in addition it could detect shear displacement fairly accurately, but it overestimated the shearing layer thickness due to propagation of strain in the probe.

Key words: Strain probe, shearing deformation of soil, flexible print circuit

Applicability of a web-based GPS displacement monitoring system to geomorphology

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A new type of web-based displacement monitoring system using GPS, which was developed by a team of Kokusai Kogyo Co. Ltd. (KKC), Tokyo in 2007, is capable of providing the three-dimensional displacement behavior of the ground surface continuously for a span of time from some hours to some years on the web site in real time. The system is composed of three segments, i.e. the measurement segment, the server segment, and the user segment. The measurement segment is composed of sensors (a terminal box with an antenna) and a control box which are placed at the monitoring site. The sensors are set at
the measurement points, and they receive the data transmitted from GPS artificial satellites. The data received from satellites are transmitted to the server computer through optical fiber or the telephone line. The server analyzed the data automatically and provides the measurement results together with information on the geological conditions, the weather, etc. to the client via the Internet. The three components of the displacement, i.e. lateral and longitudinal directions and height, are plotted in relation to time. The accuracy of measurement is ±1 mm for horizontal displacement and ±1.5 mm for vertical displacement. The good points of the system are 1) long-term monitoring, 2) high accuracy of the measurements of displacements, 3) quick data acquisition, analysis, and evaluation for many slopes at once, 4) rapid notification of the monitoring results to the users, and 5) low cost, as compared with conventional surveying methods using extentionmeters, inclinometers, electronic distance meters, etc. The system is the most effective for monitoring safely the displacements of the slopes and artificial structures due to landslide, creep, active folding and crypto-doming as well as the movement of glacier. However, the system is not applicable for monitoring the topographic changes due to erosion and deposition, because the GPS sensor unit is not stably set on the sites such as river bed and beach.

**Key words:** GPS, monitoring system

**Simulator of Landform Development**

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The author advanced the formation of a simulator of landform development for the period of ca 100 thousand years which corresponded to one cycle of glacial-interglacial climatic change in the late Quaternary. He gave mathematical and logical expression for landform changes observed in slope, river and coastal domains. In the slope domain processes of landform change, that is, material transportation were assumed to a two dimensional diffusion phenomenon, so mass movement and landslide were excluded. In this domain the most important parameter is diffusion coefficient numerically defined after rock types and climate types. The parameters control the speed of landform change and amount of sediment supply from slope to river. In the river domain sediment transportation was recognized on drainage networks. The model for the domain is a diffusion equation of which coefficient is not constant but variable of the distance, which is defined as the mean channel length at any point of drainage basin upstream. Materials such as fine sands and silts was assumed to be transported as suspended loads, therefore the materials to be passed in gravely river bed section (alluvial fan), to be deposited in meandering section and river mouth or shallow sea. Initial condition must be given as a detailed DEM, but it is difficult to obtain. The DEM needs to include the submarine region because the next 100 thousand years are mainly belong to the glacial period of low sea-level. Therefore he, the author started the simulation from the DEM virtually submerged. In this paper Deming Butte in New Mexico of US was used as a virtual initial condition, because it has an ideal landform because its pediment landform is adequately presumable to continental shelf. External conditions such as the sea level change, local crustal movement, climatic change, volcanic ash fall, etc have controlled strongly the landform development during the last Quaternary, but nobody knows how they will be in future. Despite this these conditions must be given