Geologic significance of NS-trending faults around the junction between Ryukyu and Southwest Japan arc, northwestern Shikoku.

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NS-trending lineaments and estimated faults are present in the northwestern Shikoku. Existence of these structures are thought to have great meaning for tectonics of the junction between the Southwest Japan arc and Ryukyu arc because of their location and trend that are perpendicular to the M.T.L. However, substantial study hasn't been carried out. The Horie lowland, narrow and NNW-SSE -trending alluvial lowland, is one of these structure at the north of the Matsuyama Plain. In this study, the basement structure and Quaternary stratigraphy under the Horie lowland have been investigated on the basis of gravity data and existing approximately 5000 boring data. As a result, existence of 'the Horie fault' is demonstrated. In addition, generality and geologic significance of N-S trending faults are discussed.

By the approximately 2500 points gravity data Bouguer anomaly distribution was demonstrated (correction density: 2.67g/cm3). From this distribution a regional bouguer anomaly distribution is assumed by upward continuation method (continuation height = 2km). This distribution shows a NNW-SSE-trending negative anomaly belt (minimum -3.1mGal) at the Horie lowland and it can be traced to the south end of the Matsuyama plain. In addition high inclination zone of the anomaly value is distributed between the western margin and median axis of the Horie lowland.

By the boring data a basin form of basement rock surface is declared under the Horie lowland. The depth of basement rock surface is 100~210m at median axis and 0~20m at eastern margin and western margin. Near the western margin, a step of the depth is demonstrated. This form shows good agreement with distribution of the regional negative anomaly belt and the highly inclined zone. To declare a factor of the negative anomaly, 2D density structure is simulated conducted by a Monte Carlo method. In this simulation, known parameters (density values measured value by boring core etc.) are assigned. A simulation result shows this anomaly can be explained only by above basement surface form. It means the step of depth is existed thorough the underground of the Horie lowland and the basin form are traced to the south end of the plain.

The deposits under the Horie lowland can be divided into five formations based on sedimentary fancies. These boundaries are tilted toward the step of the west. The inclination angle is 98/1000 at lower bed and becomes gentle in ascending order. This angle is too high as sedimentation.

The step of basement surface and anomaly tilt of basal formation means existing of a NNW-SSE-trending fault, the Horie fault. The basin shape and the tilted formations indicate an E-W extension stress and an activity during the Quaternary. By the basin form the Horie fault is thought to be traced to the M.T.L. active fault system, which has kinetic discontinuous. Therefore a geologic relationship between Horie fault and M.T.L. active fault system is indicated. It is considered that Horie fault works as a motional boundary of M.T.L. active fault system and is motivated by this kinematical imbalance.

From a preliminary research negative bouguer anomaly zone is distributed along the east side of the Tanbara fault, NNE-SSW-trending fault at the eastern margin of Takanawa peninsula. Under this region active subsidence basin is distributed as the Horie lowland from the thick sediment stratum. In addition, relatively high bouguer anomaly zone are recognized in the negative bouguer anomaly zone of the Iyo Sea. These structures are thought to be formed by NS trending fault or other geologic structure. It is assumed that NS trending structure are a feature of the junction between the Southwest Japan arc and Ryukyu arc.