

## **ORIGIN AND GEOLOGICAL EVOLUTION OF THE TAIPEI BASIN, NORTHERN TAIWAN**

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### **ABSTRACT**

**Having been discussed for more than 90 years, the origin of the Taipei Basin remains fraught with uncertainties and controversies. Here we integrate available tectonic and geologic information to explore a mechanism for its origin and to establish a chronicle for its evolution. We also compare our results with previous hypotheses and point out pending problems for future studies.**

**The Taipei Basin is floored with deformed Tertiary strata and filled with flat-lying Quaternary alluvio-lacustrine sediments. Because the basement rocks are similar to the deformed Tertiary strata of the neighboring mountain ranges, the Basin area must have been likewise raised during the Pliocene-Pleistocene orogeny. The orogeny, caused by collision between the Luzon Arc and the China continent, was terminated in late Quaternary time as a result of flipping of subduction polarity beneath northeastern Taiwan. Afterwards the mountain ranges have been collapsing in response to post-orogenic extension, and the frontal part subsided as the half-graben Taipei Basin.**

**Prior to the collision, the Taipei Basin area was located in the outer China continental shelf, with depositional environments alternating from coastal to shallow marine. This part of the continental shelf was deformed as a mountain belt, which was thrust upon the Linkou area along the Hsingchuang Fault at about 2 Ma. Around 0.8 Ma, the collision terminated and the mountain range began to collapse. The Hsingchuang Fault was transformed into the Shangjiao Fault, and the hangingwall slid down to become a depression. As the depression began to accumulate sediment at 0.4 Ma, the Taipei Basin was germinated. Since then the Basin has been expanding with continued subsidence and sedimentation and eventually attained its present dimension.**

**Throughout its depositional history, the Taipei Basin has been occupied by alluvial fans, fluvial plains, and estuaries, which have waxed and waned with the fluctuating sea level. At 0.2 Ma,**

the Basin was dammed up by a lahar derived from the Tatun volcanoes and turned into a deep freshwater lake. At 30 Ka, the Tahan River was diverted into the Basin and brought in a large amount of gravelly sediment to build up basin-wide alluvial fans. In early Holocene time, the Basin was inundated by marine incursion and turned into a brackish-water bay, which was then filled up to its present configuration.

**Key words:** tectonis, sedimentation, Quaternary, Taipei Basin, Taiwan

### INTRODUCTION

As one of the most prominent geomorphic features in Taiwan, the Taipei Basin has long been a focus of attention in both natural and social sciences. Nearly triangular in shape (Figs. 1 and 2), the Basin is bordered with the Western Foothills to the south and east (Pl. 1A), the Tatun volcanoes to the north (Pl. 1B), and the Linkou Tableland to the west (Pl. 1C). It is occupied by the floodplain of the Tanshui River, which has been developed into the largest and foremost important metropolis of Taiwan, including the capital city Taipei (Pl. 1A).

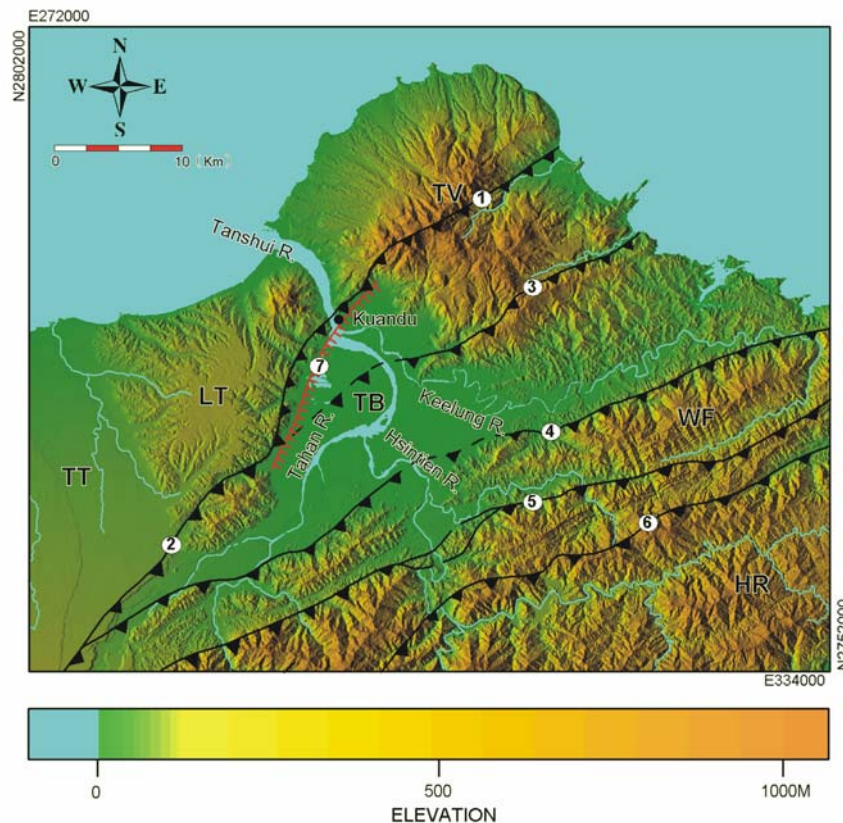


Figure 1. Geomorphic features of the Taipei Basin and its vicinity. Colorshading image of Digital Terrain Model. Geology and symbols shown in Figure 2.