The Enshu Coast of Japan

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The Enshu coast is located on the southern side of central Honshu, Japan, approximately 160 km south of Tokyo and just west of Hamamatsu (Figure 1). The western part is called Omotehama, and extends from Irago Cape (Aichi Prefecture) in the west, to the mouth of the Tenryu River (Shizuoka Prefecture) toward the east. Key features of this coastline include a relatively flat coastal zone from the Tenryu River mouth to the Hamana (or Hamanako) Lake system, sandstone cliffs from Hamana Lake towards Akabane fishing harbour and Irago Cape, which marks the entrance of Ise Bay.

The Enshu coast has been adversely affected by high, typhoon-generated waves and storm surges, and severe tsunamis. For example, the mouth of Hamanako Lake was drastically altered in AD 1498 by a tsunami generated by an 8.6 magnitude earthquake. The estuary mouth shifted by about 3.5 km turning the previously freshwater lake into a saltwater system. Figures 2, 3, and 4 show how structures altered the coastline configuration near Imagire Inlet at Hamana Lake between 1946 and the present.

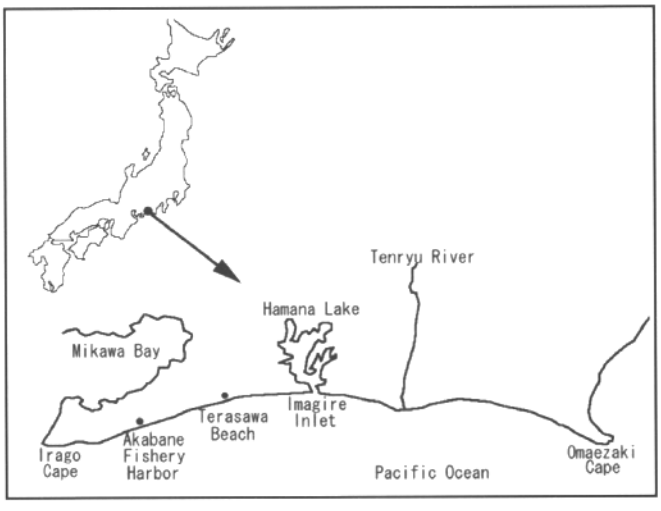

Figure 1. Map of the Enshu coast of Japan, located in south central Honshu.

During typhoons, the small Akabane Harbor is often affected by harbor resonance and storm surge. A large storm surge barrier was built behind the basin to prevent salt intrusion into the adjacent fields. Figure 5 shows the effect of the jetties and coastal protection near Akabane Harbor. Figures 6-9 show recent pictures at Terasawa Beach, between Imagire Inlet and Akabane Harbor. Additional photos may be found at http://www.uq.edu.au/~e2hchans/photo.html#Coast_Japan.

Figure 2. Aerial photograph of Imagire Inlet at Hamana Lake in 1946 showing natural sand bars formed at the entrance. Jetties were constructed between 1961 and 1973. These have interrupted longshore sediment being transported from east to west, from the Tenryu River to Irago Cape (right to left). Photo courtesy of Japan Geographic Survey Institute.

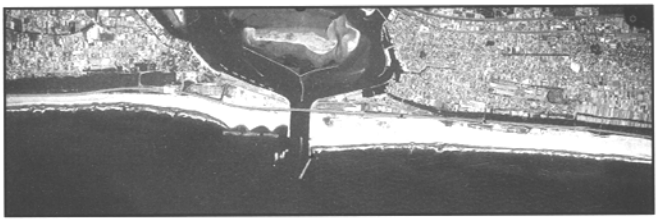

Figure 3. Imagire Inlet taken in 1997. Three detached breakwaters were constructed to protect the western beach against erosion. Photo courtesy of Japan Geographic Survey

Figure 4. Imagire Inlet in 1999, showing present-day conditions. Photo courtesy of Mr. Kato, Omotehama Network.

Figure 6. Wave runup and breakers on 30 Jan 1999 at Terasawa Beach between Imagire Inlet and Akabane Harbor. Note crane installing submerged concrete breakwater (left background).

Figure 8. Breakers and off-shore breaking with SE winds and good surf waves - Terasawa Beach photograph taken from the cliff on 14 Mar 1999. A submerged breakwater was installed off the beach the previous winter (Figure 6).

Figure 5. Aerial photograph of Akabane Harbor. Like Imagire Inlet, the breakwaters have caused drastic shoreline change on both sides of the harbour. Photo courtesy of Mr. KATO, Omotehama network.

Figure 7. Terasawa Beach wave runup near high tide and coastal protection on 30 Jan 1999.

Figure 9. Sunrise at Terasawa Beach, 25 Oct 2001. Note sediment sorting indicated by dark stripes.