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Occurrence and distribution of seismic chimneys associated with gas hydrate using 2D multi-channel seismic data in the Ulleung Basin, East Sea.

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This study presents an interpretation of 2D multi-channel seismic data for the seismic chimneys in the Ulleung Basin, East Sea. Based on the geometry, seismic reflection pattern, well log response and lithology, we identified two representative types: (a) Type-I and Type-II. Type-I is pipe-like feature seen as the vertically stacked distorted reflectors in the seismic profile. This type is predominantly distributed on the northern part of the basin floor. Most of Type-I is connected to underlying deep seated fault. The well log response and lithology of Type-I indicate that they preserve the primary properties of sediments. Type-II is cone-like feature seen as transparent or chaotic reflection pattern in the seismic profile. The well log interpretation reveals that the Type-II consists of homogeneous and monotonous mud, different from same stratigraphic level. This type dominantly appeared over the mass transport deposit. Moreover, the distribution of Type-II represents a robust relationship to the underlying structural highs located on the northern and eastern basin floor. Our current study suggests that Type-I is a consequence of the natural hydraulic fracturing and Type-II results from the intrusive sediment remobilization. Indeed, the underlying structural highs and mass transport deposit mainly influenced the distribution of Type-II. The deep-seated fault, reactivated during the Quaternary, probably developed the Type-I.