



Occurrence and seismic characteristics of stacked Quaternary debris-flow deposits in the Ulleung Basin, East Sea

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Analysis of multi-channel seismic reflection profiles collected from the Ulleung Basin, East Sea reveals that the Quaternary sequence in this area includes eighteen stacked debris flow deposits, which are variable in the geometry and spatial distribution. Each deposit is acoustically characterized by chaotic or transparent seismic facies without distinct internal reflections and shows wedge or lens-shaped external form. Based on distribution patterns, these deposits which form a succession of vertically and/or laterally stacked wedges are widely distributed on the southern slope and cover an area of more than 8,000 km². Their general flow direction is from south to north and the thickness gradually decreases toward the basin plain. The results of seismic interpretation suggest that sedimentation during the Quaternary was controlled mainly by tectonic effects associated with sea-level fluctuations. The back-arc closure of the East Sea that began in the Miocene caused compressional deformation along the southern margin of the Ulleung Basin, resulting in regional uplift which continued until the Pliocene. Large amounts of sediments, eroded from the uplifted blocks, were supplied to the basin through the mass transport processes, leading to the formation of stacked debris-flow deposits. Consequently, the development of debris flow deposits in the Ulleung Basin is largely controlled by regional tectonic event associated with the back-arc closure of the East Sea.