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Study on the landslide developmental characteristics in the upper reaches of the Yellow River NE Tibet Plateau

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The upper reaches of Yellow River (YR) northeastern (NE) Tibet Plateau (TP) is a high prone zone of geological disasters in western part of China (Zhang et al., 2000; Yin et al., 2010), in the region, some large-scale and giant landslides are notable for their scale, complex formation mechanism, and serious destruction (Huang, 2003, 2007; Qin et al., 2012). In this paper, several different high resolution kinds of remote sensing data, such as QuickBird (QB) $\$ GeoEye, ZY-3 $\$ ZY-1 02C $\$ Google earth, et al, were used to be source data and combined with ways of field survey and remote sensing verification to carry out the spatial morphological patterns and their distribution characteristics of landslides, and obtained the following conclusions:

1) Remote sensing images of landslides characteristics are very obvious clearly in the study area, and the authors founded that 508 landslides and the largest number of them are distributed in the Qunke-Jianzha basin (Fig.1). 2) The spatial morphological flat patterns distribution of landslides can be divided into eight categories, they are round-backed armchair-like and semi-elliptical pattern, dustpan pattern, dumbbell pattern, tongue pattern (including long tongue, rectangular, mat, stepped shape and etc), saddle pattern, long-arc pattern and triangular pattern.

3) The rock and soil types of landslides can be divided into four categories, loess landslide, mudstone landslide, semi consolidation diagenetic landslide and rock landslide and the number of mudstone landslides are the most.

4) The length and width of landslides mass are mainly concentrated on 550-1500m and 600-1500m, and they were extended direction by different polarization (Fig.2).

5) The average elevation of landslides are mainly between 2400-2800m and the relative elevation differences of the front sheer opening and back trailing edge are concentrated on the 150-400m and around 750m. And a good linear relationship between the average slope angle,



Fig.1. Spatial distribution characteristics of landslides in the study area

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Fig.2 The linear relationship of length (L) and width (W) of landslides mass

relative elevation difference and the length of landslides mass.

The results of our research will provide a basis evidence for serious geological disasters prevention and environment protection in study area.

Keywords: Remote sensing; The upper reaches of Yellow River; Landslides; Developmental characteristics

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