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摘要: 构造活动强度 α (≤ 1) 和地壳稳定程度 β (≤ 1) 是构造活动性评价和工程稳定性区划的重要参数, $\alpha = 1 - \beta$ 。对青藏铁路沿线任一单元 i , 以断层运动速率 (v_i)、地震震级 (M_i)、温泉温度 (T_i) 和构造应变 (ϵ_i) 综合刻画构造活动强度 (α_i), $\alpha_i = (v_i / v_{max} + M_i / M_{max} + T_i / T_{max} + \epsilon_i / \epsilon_{max}) / \alpha_{max}$ 。根据各单元构造活动强度值 (α_i), 应用克里格等值线绘制软件, 编制构造活动强度等值线图, 为青藏铁路沿线构造活动性评价和工程稳定性区划提供定量判据。 $\alpha \geq 0.40$ 的构造活动区可能孕育 $M_s \geq 6 \sim 7$ 级地震, 对应于不稳定区; $\alpha \geq 0.70$ 的强烈构造活动区可能孕育 8 级左右强烈地震, 对应于极不稳定区。区划结果表明, 青藏铁路沿线发育昆仑山南、可可西里、通天河、唐古拉山、错那湖、当雄、羊八井 7 个不稳定区, 其中包括西大滩、谷露盆西、羊八井 3 个极不稳定区。

关键词: 构造活动强度; 工程稳定性; 定量评价; 青藏铁路沿线

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Abstract: The strength of tectonic activity α (≤ 1) and crustal stability β (≤ 1) are two important factors for the assessment of tectonic activity and division of engineering stability, as well as selection of engineering sites, and $\alpha = 1 - \beta$. For any unit i along the Golmud - Lhasa Railway, the strength of present tectonic activity (α_i) may be evaluated by four factors, namely, the slip rate of active fault (v_i), magnitude of earthquake (M_i), temperature of hot spring (T_i) and tectonic strain (ϵ_i), and $\alpha_i = (v_i / v_{max} + M_i / M_{max} + T_i / T_{max} + \epsilon_i / \epsilon_{max}) / \alpha_{max}$. According to the values of α_i for various units, a strength contour map of tectonic activity was compiled automatically by using the software of drawing Kriging contours, providing the quantitative criteria for assessment of the tectonic activity and division of engineering stability along the Golmud - Lhasa Railway. It has been demonstrated that the tectonically active region with $\alpha \geq 0.40$ may produce $M_s \geq 6 - 7$ earthquakes, corresponding to an unstable region and that the tectonically very active region with $\alpha \geq 0.70$ may produce $M_s \geq 8$ earthquakes, corresponding to an very unstable region. Seven unstable regions, i.e. the South Kunlun Mountains, Hoh Xil, Tongtian River plain, Tanggula Mountains, Co Nag Lake, Damxung and Yangbajain, and three very unstable regions, i.e. Xidatan, west of Gulu and Yangbajain, are identified along the Golmud - Lhasa section of the Qinghai - Tibet Railway.

Key words: tectonic activity; crust stability; quantitative evaluation; Golmud - Lhasa Railway

