

Ablation Estimation on the Keqicarbaxi Glacier on the South Slopes of the Tianshan Mountains

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Abstract Energy balance model is one of the most accurate methods which are used to estimate the glacier surface ablation. Using field meteorological data measured by automatic stations on Keqicarbaxi Glacier and relating 1:50 000 topographic map, global radiation and net radiation are accommodated by Topography-Adjusted on the small scale based on slope and aspect. Meanwhile, the turbulent fluxes are calculated from the bulk aerodynamic approach, and the computed ablations are compared with measurements taken from the stakes. The results demonstrate a relatively high consistency between the calculated and measured global radiation, and the correlation coefficient is 0.85, while the calculated net radiation has rather big difference with the measured. The ablation estimation reflects basically the observed ablation value, with the mean error is 2.9 mm w. e./day and the root mean square (RMS) is 4.2 mm w. e./day. The simulated ablation is general greater than the measured. The simulation error of single point ablation was increased gradually along with the increasing of altitude distance between the lattice and automatic weather station.

Key words Glacier; Keqicarbaxi; energy balance model; topography-adjusted; ablation estimation; the south slopes of the Tianshan Mountains

封面照片说明: 茂县土地岭

土地岭位于四川省茂县县城东约 7 km² 地带, 处于龙门山中段, 是岷江水系与涪江水系的分水岭, 最高峰老君山海拔 3 468 m, 最低处县城边静州村一带, 海拔仅约 1 600 m, 地形起伏巨大, 属深切切割的高中山地貌; 气候温暖湿润, 年均温 9℃左右, 年降雨量 > 800 mm, 属暖温带气候, 十分利于植被生长。因此, 土地岭植物资源丰富, 森林覆盖率高, 以人工林和次生灌丛为主, 主要树种有华山松、油松、冷杉、桦、红豆杉、冬青、水青冈、槭树等; 灌木林主要由悬钩子、水杨梅、胡枝子、小叶杜鹃等构成; 草本植物有艾蒿、蕨类、禾草等。林中栖息着红腹雉、锦鸡等珍禽鸟类, 还有苏门羚、大熊猫、岩羊等保护动物出入。这里森林茂密, 绿荫无际, 小溪流水潺潺, 清澈见底。站在山顶, 举目眺望, 近处青翠欲滴, 远处群山绵绵, 满山生机勃勃。尤其值得一提的是, 云和雾是土地岭的一道令人赏心悦目、心旷神怡的景致。清晨, 山岭往往被乳白色的云雾所萦绕, 身处其间, 神秘的感受油然而生, 偶尔的鸟鸣声, 不禁使人想起“空山不见人, 但闻人语响”的诗句, 并深切感受那种幽静绵绵的诗情画意。

(山水)