

The Design and Application of a Portable Soil Air In-situ Collector under Conditions of Alpine-cold in the Grassland , Northern Tibetan Plateau

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Abstract: In the alpine-cold grassland of Northern Tibetan Plateau , ordinary soil air collectors would show a limitation of suitability and economic , besides the deficiencies of complex structure , inconvenience to carry , interferences from soil impurities , etc. Based on the thought of “collection in-situ to damp disturbance , impurity removal to control errors and portable for more practicality” , a portable soil air in-situ collector with a tubular multi-level nested structure and a waterproof and breathable transom was presented , which only has minimally invasive on soil structure , can effectively remove the outer air , reduce the impact of soil moisture and soil fine particles of solid matter , and is applicable under the complex conditions of the grassland , Northern Tibetan Plateau.

Key words: in-situ soil air collector; tubular multi-level nested structure; waterproof and breathable transom; Alpine-cold grassland; Northern Tibetan Plateau

封面照片: 羌塘高原申扎县格仁错湿地

“羌塘”藏语全称为“羌东门梅龙东” , 既“北方高平地”之意。羌塘高原是青藏高原的组成部分 , 亦为高原最大的内流区 , 是青藏高原内海拔最高、高原形态最典型地域。其平均海拔 4 800 m , 相对高度一般 200 ~ 500 m , 气候寒冷而干燥 , 年平均气温大都在 0℃ 以下 , 最暖的 7 月平均气温 6 ~ 10℃ , 年均降水量 50 ~ 300 mm , 寒冻风化与冻融活动等形成的冰缘地貌普遍 , 为北半球中低纬度地带多年冻土最为发育地区。

羌塘高原拥有世界上湖泊数量最多、湖面最高的高原湖区。面积总合超过 25 000 km² , 是中国湖泊总面积的 25% 。据统计 , 羌塘境内有近 500 个面积超过 1 km² 的湖泊和 300 多个面积超过 5 km² 的湖泊 , 其中比较大的湖泊有纳木错(1 920 km²)、色林错(1 640 km²)、扎日南木错(1 023 km²) 等 , 这些湖的湖面均超过 1 000 km² 。湖泊除少数为风沙沉积物堵塞或冰川作用形成外 , 多属构造湖。

照片为羌塘高原的那曲地区申扎县格仁错湿地 , 湖面海拔 4 650 m , 面积 475.9 km² 。湖泊形状呈东北 - 西南走向的长条状。湖水主要是冈底斯山冰川与积雪融化的补给 , 湖水矿化度低 , 适于水生生物与水禽的生长和繁衍。尤其是低洼湖区内广泛分布沼泽草甸滩地 , 使这里发育着良好的内陆湿地和水域生态系统 , 并成为国家一级保护动物黑颈鹤的理想栖息环境 , 是国内现有 7 个黑颈鹤保护区中海拔最高、面积最大的一个。

(吴建波)