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Nitrogen chemistry in surface waters and wet deposition at high altitude in the Sagarmatha (Mt Everest) National Park.

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The knowledge of the nitrogen cycle is mainly based on studies conducted in relatively human-altered zones located in the north-western hemisphere. Therefore it is of great interest to identify the limits of natural variations of nitrogen in ecosystems that have not experienced the nitrogen pollution, and have undergone minor alterations from human activities. Among the alpine environments of the world, the region of Mount Everest, is a unique ecosystem with a degree of biodiversity among the highest existing, but characterized by a recognized fragility and low resilience. The extreme climate, the slow growing seasons and the thin soils make this ecosystem very sensitive to any environmental change.
A yearly sampling campaign was conducted in the Sagarmatha National Park (Nepal) during the monsoon season in 2008 to collect surface water samples at high elevation from 4300 to 5500 m asl. In addition during 2007 and 2008 the sampling of wet deposition was carried on at 5050 m asl at the Nepal Climate Observatory - Pyramid ABC site.
The nitrate concentration in the running waters fell in the lower range of the values reported for comparable environments in Europe. As well, the wet deposition load of nitrogen was remarkable lower than those observed in high elevation areas in Europe and North America. A comparison among running waters, precipitations and small lakes, located in the same area, revealed significant higher nitrate concentrations in running waters compared to the other two matrixes. Conversely, ammonia level resulted higher in the rain compared to surface waters. The spatial and temporal variation of the chemical species in running waters were analyzed taking in account the use of soil in the basins and the hydrological regime.