European Mountain lake Ecosystems: Regionalisation, diaGnostics & socio-economic Evaluation

EMERGE

27

CATCHMENT HYDROLOGY

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Catchment hydrology

1. Major aims

At experimental sites the following topics should be assessed for the hydrological year 2000 (i.e. October 1, 2000 to September 30, 2001) both by measurements and calculations:

- Size of the lake catchment
- Lake water residence time
- Hydrological balance of the catchment

2. Measurements

2.1 Precipitation

- Precipitation may vary considerably within a catchment.
- Measured amounts may be effected by several errors, like wind induced errors, losses due to evaporation and wetting of the receptor area, etc. It is, therefore, more likely to underestimate catchment precipitation than to overestimate it by your measurements.

The exposition of several collectors at distinct representative sites will improve the assessment of the catchment precipitation. In order to keep all effort to a feasible extent we recommend to use:

- collectors for atmospheric deposition sampling (see protocol on Atmospheric Deposition)
- a precipitation gauge connected to the automated weather station (see protocol on Climatology and Meteorology)
- a totalizing precipitation gauge (containing anti-freeze and oil, which prevents the collected water from evaporation)
- If possible distribute some collectors (e.g. large buckets) within the catchment, fixing them about 2 m above ground (be aware of the expected height of the snow cover).

The sampling interval should be as short as possible in order to minimize errors, e.g. evaporation losses or the redistribution of collected snow out of the open buckets.

2.2 Snow pits

See protocol on Atmospheric Deposition – Sect. 3 : Snow pack

2.3 Lake water level (lake volume)

To measure the lake water level use a gauge equipped with a strip chart recorder or a pressure sonde with data logger recording either continuously (strip chart) or at hourly intervals (data logger). The recommended resolution for the lake level is 0.5 to 1 cm. Regularly check the recorded water level with a reference rule fixed at the shore.

2.4 Lake outlet (discharge)

For both water level and discharge measurements you need a well defined profile of the lake outlet. For instance, you lead all water through a tub of metal (stainless steal, wood, etc.). Use a water level gauge equipped with strip chart or a pressure sonde with data logger recording either continuously (strip chart) or at hourly intervals (logger).The recommended resolution for the lake outlet level is 0.5 cm.
For the calibration line between the water level of the lake outlet and the corresponding discharge (e.g. liter / min) you have to measure discharge at various water levels. This is particularly important during times of high discharge, i.e. snow melt or heavy rain events.

2.5 Lake tributaries

Water level measurements of tributaries are optional, but may give important additional information. See Sect. 2.4 about Lake outlet for further information.

2.6 Automatic weather station

See protocol on Climatology and Meteorology. Parameters like air temperature, relative humidity or wind speed will be used to estimate the amount of catchment evaporation.