

# Assessment of moisture reserves by CR secondary neutrons sounding method

Friday 16 July 2021 19:18 (12 minutes)

The technique of monitoring the moisture content in soil using CR neutron detectors of special design is being actively developed. For mountainous areas and northern countries, monitoring of the thickness of the snow cover is also relevant. The technology makes it possible to bridge the gap between local measurements and remote sensing on a catchment scale ( $100 \times 100 \text{ km}^2$ ) using spacecraft. It provides an opportunity to measure in real time the content of soil moisture and the thickness of the snow cover on a scale of ten hectares, determined by the range of neutrons travel in the lower atmosphere, which is  $\sim 250 \text{ m}$ . We used data from two types of such detectors: 1) an epithermal neutron detector with 6 boron counters, counting rate about 13 pps (pulses per second) and 2) a thermal neutron detector (a single counter without a moderator, 2 pps). We estimated the amount of moisture in the soil and on its surface in the form of snow. Having a long series of measurement data for epithermal and thermal neutrons (since 2010), in this work we considered in detail the results for 2018-2021. Special attention is paid to the method of introducing various corrections. The method used to estimate moisture is relative and therefore requires the calibration of such a detector. For the winter period, such a calibration was carried out. The thickness of the snow cover in the periods under consideration reached  $11 \text{ g/cm}^2$  (including melting), the error is estimated as  $\pm 0.2$  (stat)  $\pm 0.4$  (sys)  $\text{g/cm}^2$ .

## Keywords

cosmic ray application agriculture

## Collaboration

## other Collaboration

## Subcategory

Experimental Methods & Instrumentation

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**Session Classification:** Discussion

**Track Classification:** Scientific Field: CRI | Cosmic Ray Indirect