



# The new Athens Center on data processing from the Neutron Monitor Network in real time



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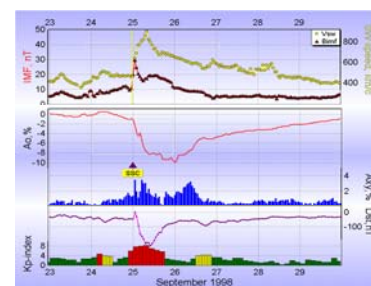
(b) Geomagnetic Storms

## Basic ideas

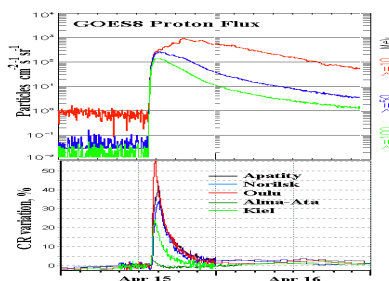
Disturbances of the solar wind, magnetosphere and cosmic rays (CR) are closely related, since they are caused by the same active processes at the Sun. Therefore the effect of the solar wind disturbances on cosmic rays may extend to large distances and due to their relativistic velocity, CR bring valuable information on these disturbances, well in advance of their arrival at the Earth. Characteristic signatures of CR can be selected by special methods from the neutron monitor network (NMN) and so real time data combined with developed and tested methods, should be used for successful prediction on Space Weather

## Space Weather Forecasting

A reliable center such as the Athens Neutron Monitor one provides an operational monitoring able to forecast space weather effects. At this point this center is being used onward two directions. Specifically, (a) the first direction is a prediction of Ground Level Enhancement (GLE) or 'GLE Alert' and (b) secondly the forecast of interplanetary shock arrival.



(a) GLE Onset

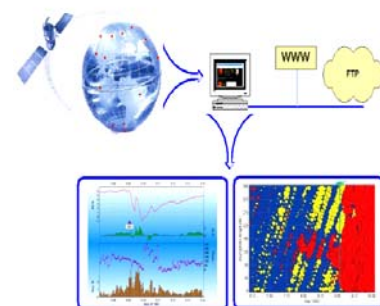
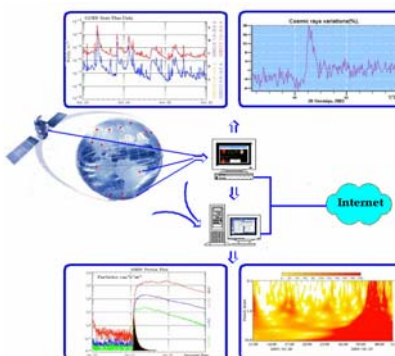


Solar relativistic particles registered at Earth have an essential property to bring information on solar and interplanetary conditions much earlier than low and mid energy solar particles

## Athens Neutron Monitor Center



Nowadays a number of special programs allow the calculation of parameters of CR, by using as many neutron monitors as possible. The use of all stations as a unified multidirectional detector, made the accuracy substantially higher (< 0.1% for hourly data). Twenty-one NM stations provide their data in real time to the main server of Athens in digital form. Advanced algorithms evaluate all data and produce preliminary summarized graphics from all stations.



## References

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High energy particles come from the Sun in 8-20 minutes after acceleration, whereas the main part of lower energy particles usually come later in more than 30-60 minutes. Proton events registered at Earth (GLEs) have a complete profile well before the enhancement evolving in the lower energies. This fact can be used for the calculations of spectra and fluxes for lower energies at different levels in 20-30 minutes after the onset

