Slovak Video Meteor Network – Meteor Spectra

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With the updated All-Sky Meteor Orbit System (AMOS) (called AMOS-Spec) we aim to measure the main element abundances of meteors. Here we report the best eight cases.

1 Introduction

After the great success of the All-Sky Meteor Orbit System (AMOS) (Toth et al., 2011; Zigo et al., 2013), we upgraded the system by adding an AMOS-Spec camera to record meteor spectra. The long-term AMOS-Spec program aims to measure the main element abundances of meteors detec-ed by AMOS. Meteor spectroscopy has received much attention in recent years due to its ability to indirect meas-urement of the main element composition of small bodies of the Solar System, which offers important scientific bene-fits. Meteor spectra are emission lines containing, in ma-jority, emission features belonging to meteoroid vapours, as well as some lines of atmospheric origin. Here we report results from a sample of meteor spectra collected by the AMOS-Spec camera from November 2013 to May 2014.

2 Observations and results

AMOS-Spec system

Installed at Modra Observatory in Slovakia, the AMOS-Spec system is based on the original AMOS camera. It is equipped with a 30 mm f/3.5 lens (FOV 140° x 100°) and a 500 grooves/mm grating. The limiting magnitude of a me-teor for our system (with optimal geometry of meteor flight in front of the camera, and optimal meteor velocity) is around magnitude -2.

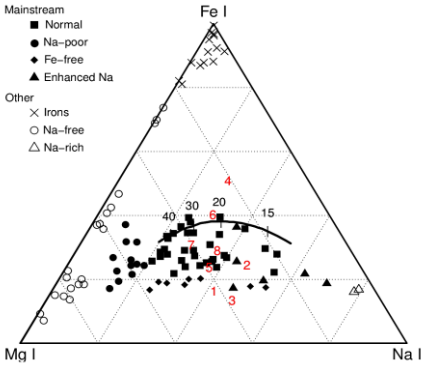

Figure 1 – The measured relative intensities of the Mg I, Na I, and Fe I multiplets. Our data (red) are compared to those derived by Borovicka et al. (2005), defining several classes of meteors.

Data reduction

Since the start of the operation of the AMOS-Spec camera, we collected over 500 meteors. So far we have captured 45 meteor spectra of variable quality. The collected data has been reduced and the first stage of spectral analysis has been conducted. The spectral events were corrected for dark current, flat-fielded, and multiplied by the cameras spectral response curve. The wavelength scale for each spectrum was determined by means of known lines (Fe, Mg, and Na) in the calibration spectrum, with a spectral resolution of 2.5 nm/pix. If an event was recorded simultaneously by more than one station, we were able to determine a heliocentric orbit for that meteor. Here we report the best eight cases (Figure 1).

3 Summary

Spectroscopic analysis is the most powerful scientific tool for studying celestial bodies. Its power in the meteor field is that it allows us to study the chemical composition and other properties of meteoroids and of their parent bodies. Nowadays, spectroscopic observations of meteors are most-ly routinely carried out during meteor shower campaigns. However, a regular yearlong survey is needed to take full advantage of meteor spectroscopy. It was with this intention that the AMOS-Spec program has been created, to help us to fill this gap.

Acknowledgment

The work is supported by the Slovak grant APVV-0517-12, APVV-0516-10 and VEGA 1/0225/14.

References

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