Adapting meteor databases to applied research

Author: Svitlana Kolomiyets

Kharkiv National University of Radio Electronics
14 Nauka ave., Kharkiv , UKRAINE
BL Kashcheyev Radio Astronomy Research LAB

E-mail: s.kolomiyets@gmail,com

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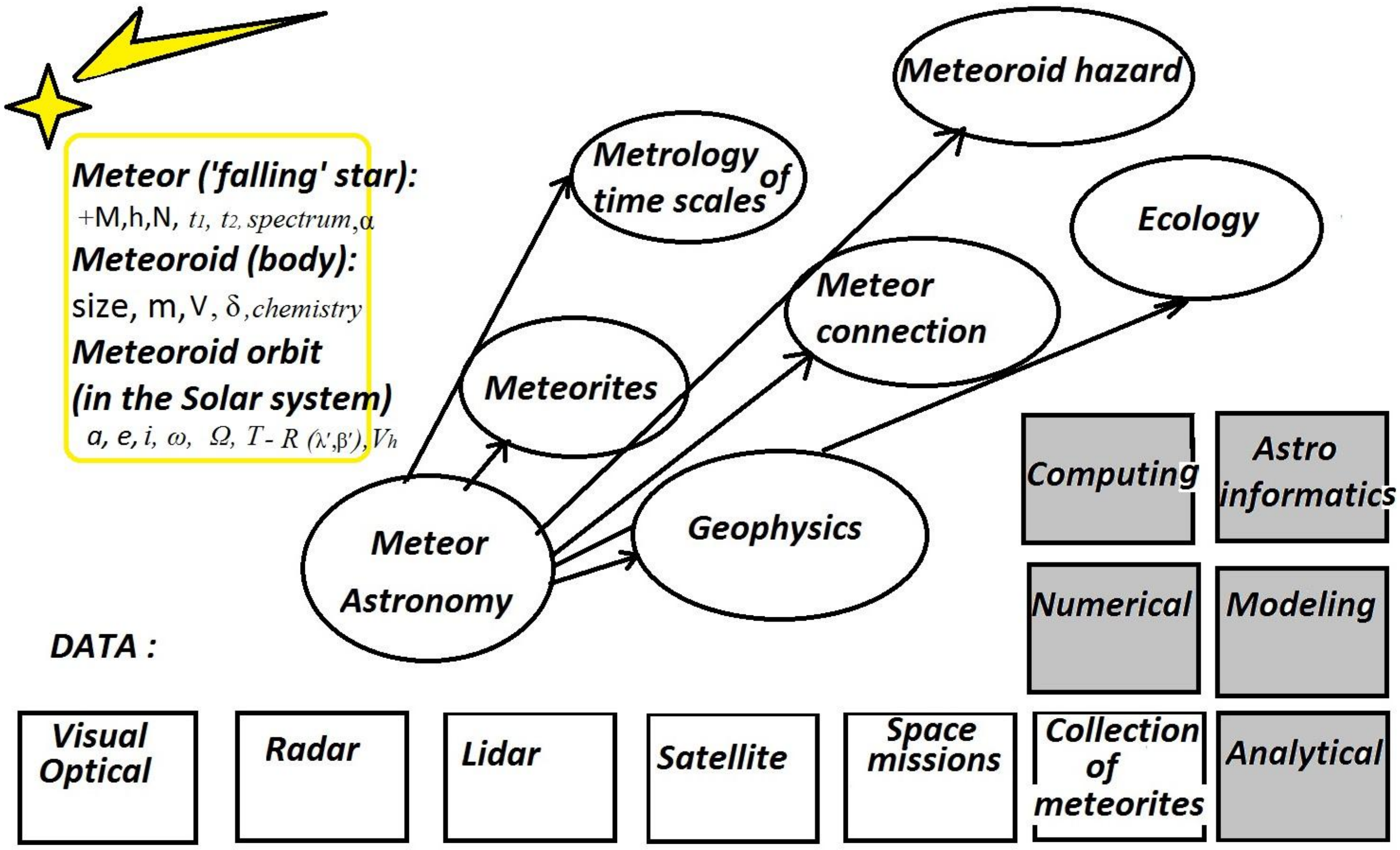
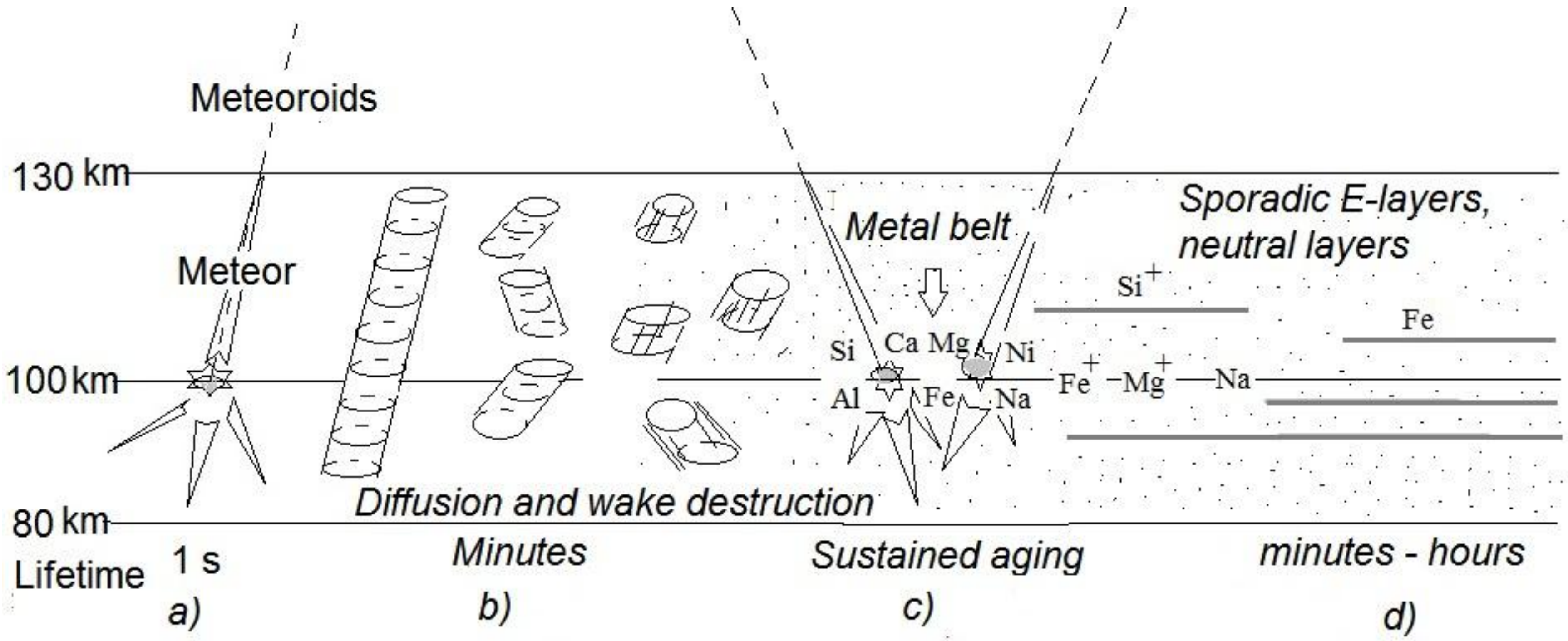
Aim and problem

- ***Aim of research:*** to show the importance of adaptation of meteor data arrays to applied problems of meteor astronomy such as e.g., the forecast of meteoric material influx, or creating the meteor weather maps.
- Meteoric material enters atmosphere of the Earth from space every day as the agent of influence on the ecology. Meteor forecast can be streamlined just like the everyday weather forecast in a form of a data set. Meteor weather will undoubtedly have its own special parameters, which are yet to be developed. Since dust in the atmosphere can be of volcanic, anthropogenic, etc. origin, it is important to estimate the amount of meteoric dust in the general balance of the dust, and to investigate the process of influx of such dust with an evaluation of its performance.

S14.11_Kolomiyets: Adapting meteor databases to applied research



Spatial-temporal development of the meteor phenomenon. Although the existence of thin ionized layers at ~ 100 km (heights) has been known, it is only much more recently that thin neutral metal layers have been observed. Such layers, initially sodium and more recently calcium and iron, have been detected by lidars.



Discussion

- Meteors in the Earth's atmosphere are divided into sporadic and streaming.

  Shower meteors have considerable local statistics, and their aftereffect in the form of sodium (etc.) precipitating clouds is well known. But formation of such layers can also occur from sporadic meteors. E.g., spectrometric studies show yellow glow of 'sodium layer' in the atmosphere at altitudes of main meteoroid ablation at 80-105 km. The connection and interaction between atmospheric aerosols and meteor dust is also known. With the advent of a new era in Earth remote sensing from the near-Earth spacecraft a new requirement is formed to update the existing data on meteors with a new look of employing numerous existing meteor databases

$Q(M)$ / flux density of meteoroids with a mass greater than the specified M

s / distribution parameter ***s*** of meteoroids by mass

M^* - minimum registered mass (in Kharkiv for MARS radar ~1.6·10^-6 g)

$Q(M^*)$ - flux density of meteoroids

$N(t)$ - number profiles

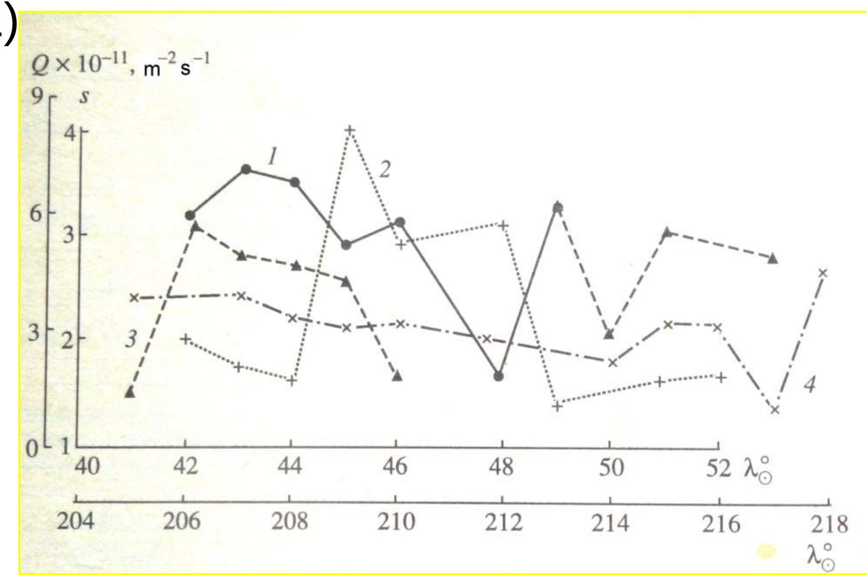
$S_{eff}(t)$ - effective area of the collecting surface of the antenna in the echo plane

k_1 - parameter for the distribution of radiometeor amplitudes of echo (Voloshchuk , Kashcheyev., 1981)

$$s = F(k1, V)$$

$$Q(M^*) = \frac{N(t)}{S_{eff}(t)}$$

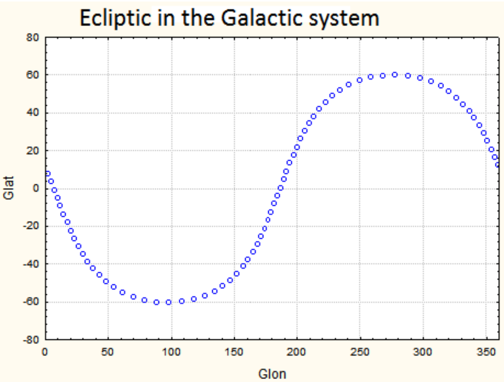
$$\frac{Q_0(M^*)}{Q_1(M_1)} = \left(\frac{M_1}{M^*}\right)^{s-1}$$

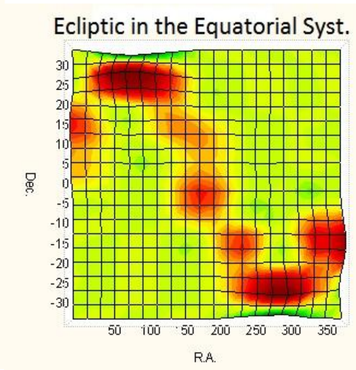


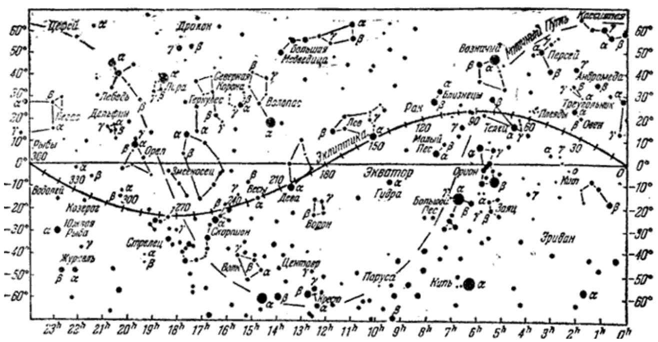
$Q(M > 0.001g)$: Eta-Aquariids(2)-2,9·10^{-11} м$^{-2}$·с$^{-1}$;Orionids(4)-2,5·10^{-11} м$^{-2}$·с$^{-1}$

(1)-s(mean)=1.65 (3)-s(mean)=1.65

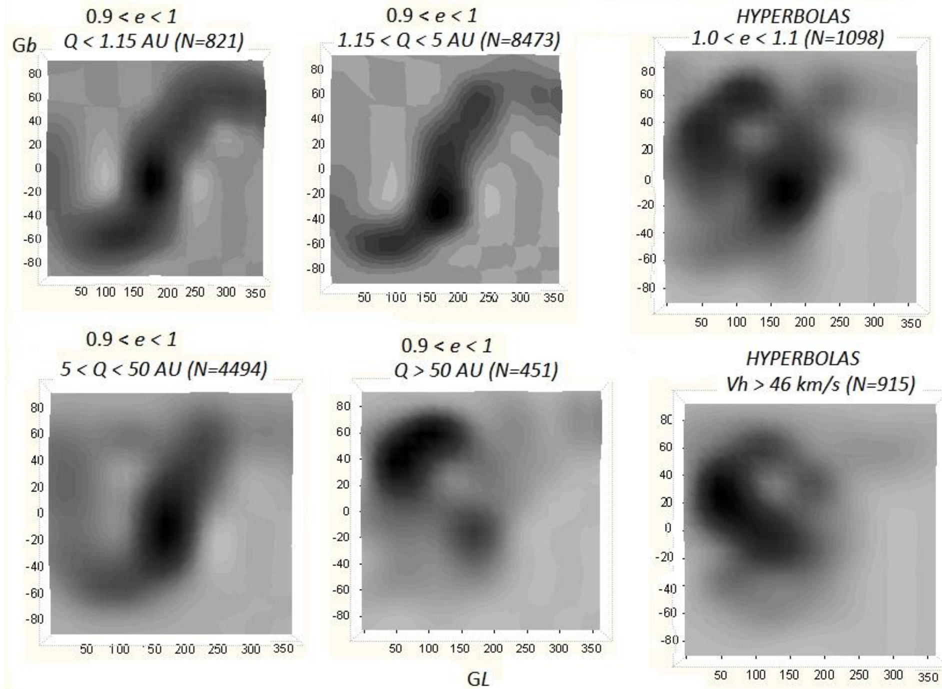
Ecliptic in the Galactic/Equatorial Syst





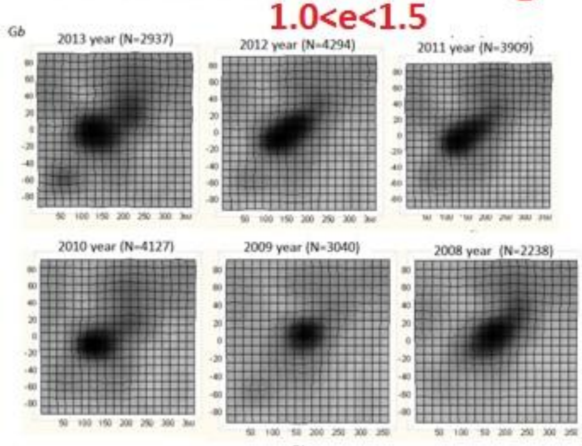


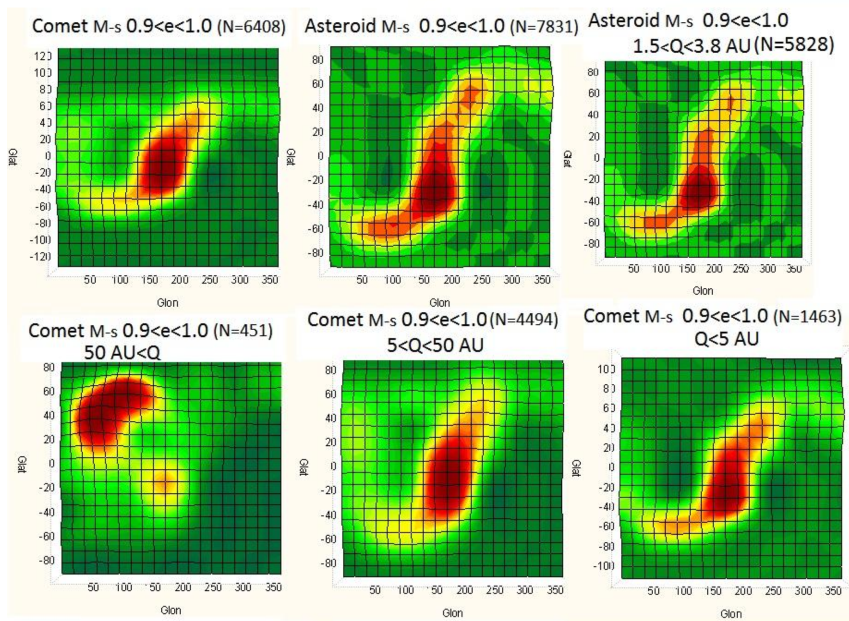
MARS data 1972-1978 (Kharkiv,UKRAINE)



SonotaCo TV catalogue

1.0<e<1.5





Conclusions

- Meteor Data Centre IAU and others databases (as and Virtual observatories) are important tool of meteor research.
- Differences were found in the meteor distributions for the different databases and different samples from ones. It is the problem in meteor astronomy thanks selectivity etc.
- The connection and interaction between atmospheric aerosols and meteor dust need in approval in future research.
- Our working project connect with visualization of meteor data. It is the first step to choice parameters for “meteor weather”.

Acknowledgments

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