

EARS, MARS Combined Meteor Radio Observations - 2014

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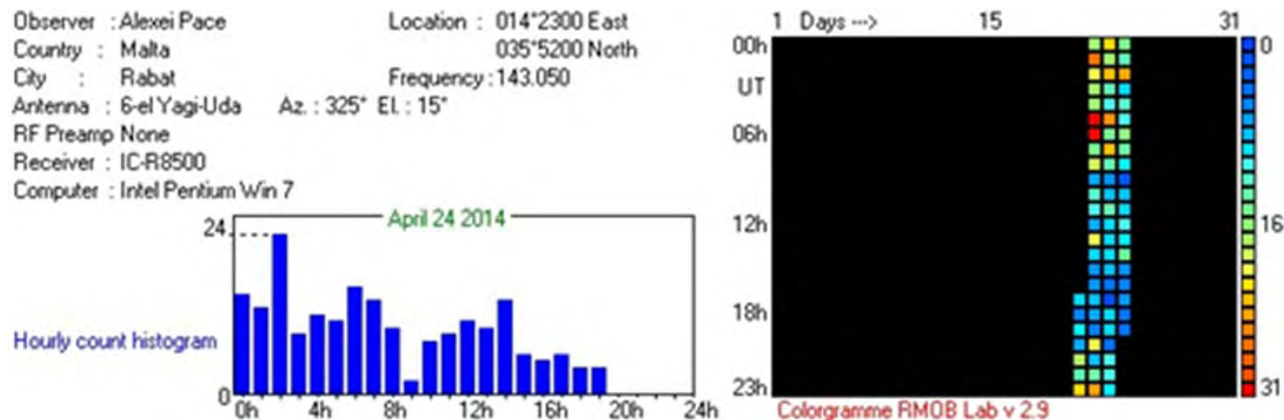
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Introduction

- **Introduction**
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- The Lyrids meteor shower was generated on 21-22/04/2014 by the passage of our Earth in the path of the debris of the comet C/1861 G1 (Thatcher).
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- The EurAstro Radio Station (EARS), based on the forward scattering principle and operated by myself, adopted the following configuration: radio beacon from radar Graves (emitter at Broyes-les-Pesmaes, 47° 20' 51.72" N, 5° 30' 58.68" W, about 500 Km from Munich) [1], vertical antenna J-Pole 144 [2], receiver ICOM 1500 (USB mode, 143,049 MHz), computer Pavillion dv6 (processor Intel Core Duo T2500) and SpecLab V26 b10 [3].
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- In order to catch the max of the Lyrids 2014, the EARS radio recording was started on 21/04/2014 at 15:00 UT and stopped on 24/04/2014 at 05:50 TMEC. For the first time, EARS and the Malta Astro Radio Station (MARS) operated by Alexei Pace worked in parallel for a combined radio observation campaign, in order to provide a cross check of the results.

Lyrids 2014 – MARS Results

- MARS, because of its distance (about 1500 Km) from the radar Graves emitter, is not influenced by the airplanes radio reflections (cf. Figs. 3-4). Therefore, an automatic meteor counting program was used. The configuration of MARS and the results of the MARS radio observations of the Lyrids 2014 are summarised in Figs. 1-2.



- Fig. 1 : MARS position, configuration and radio observation colorgramme

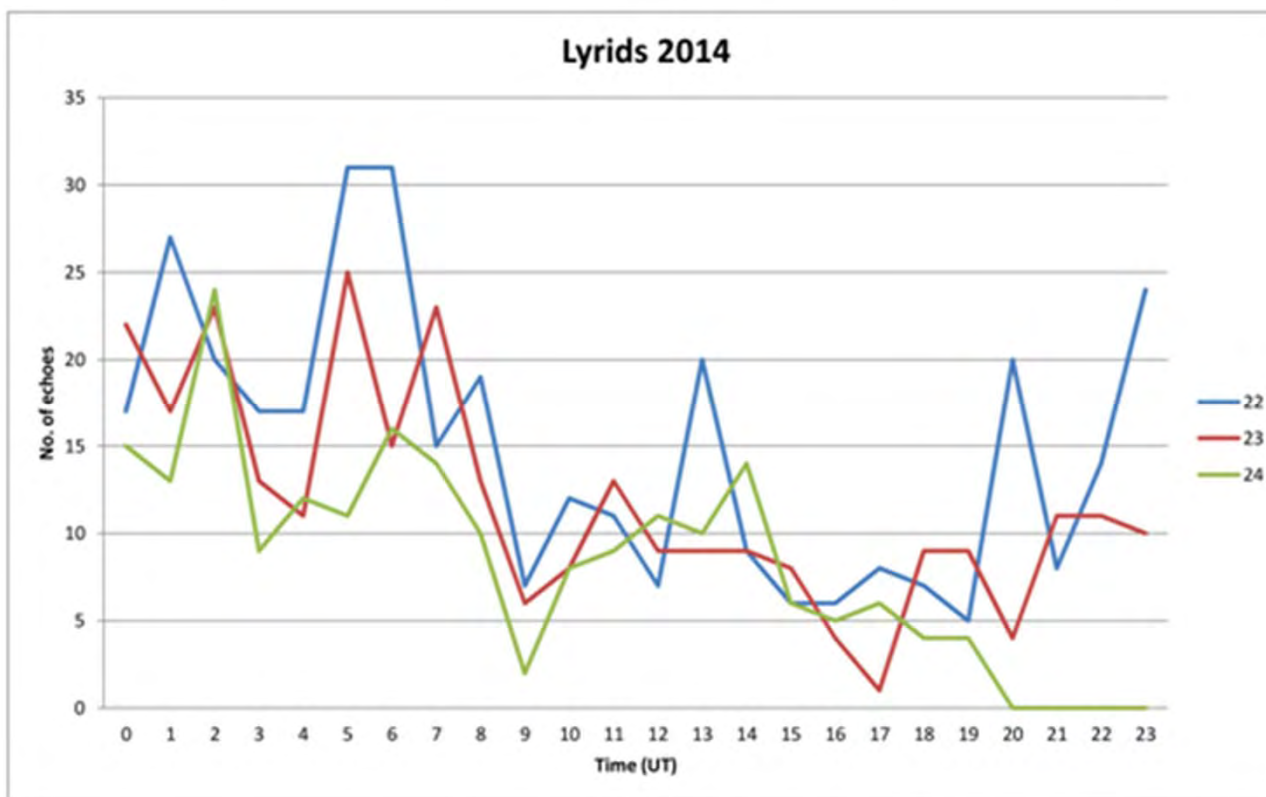


Fig. 2: MARS – Lyrids 2014 counting details

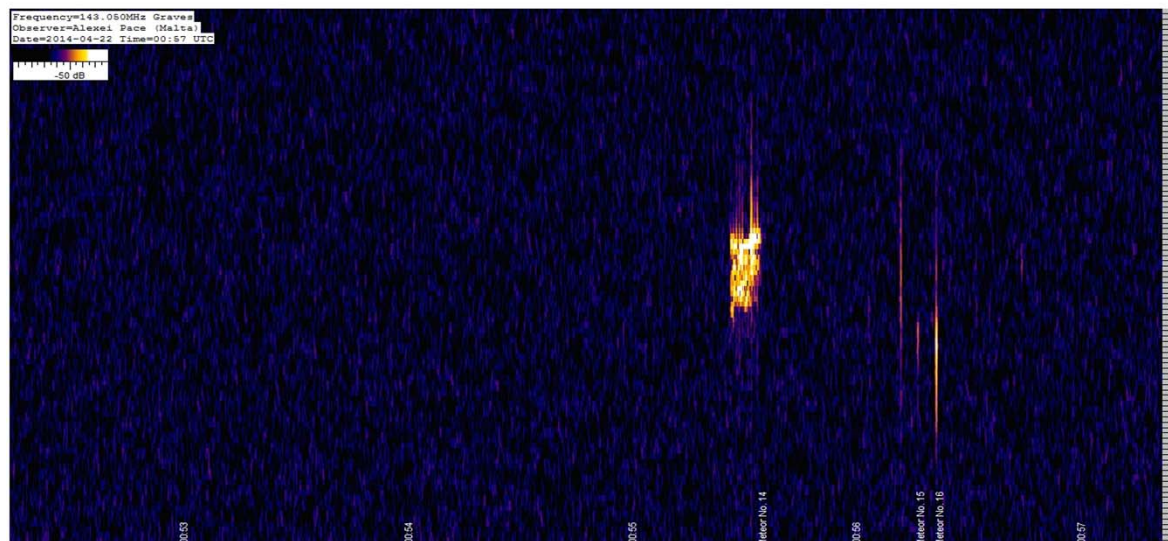


Fig. 3: MARS - Lyrids 2014 – 22/04/2014, 00:57 UTC, overdense radio echo in middle right and three underdensities radio echoes on the right

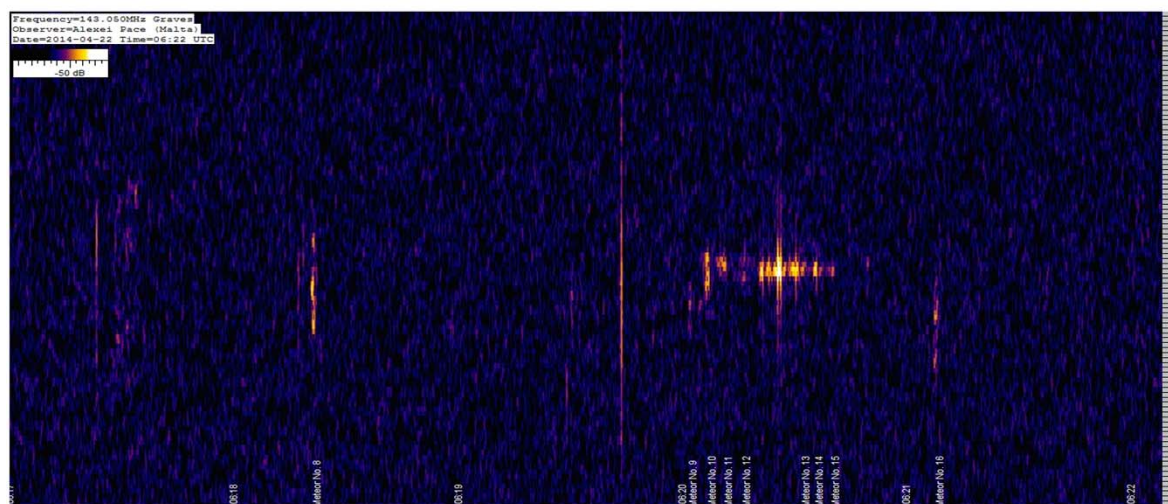


Fig. 4: MARS - Lyrids 2014 – 22/04/2014, 06:22 UTC, two overdenses radio echoes in middle right and underdensities radio echoes on the left and on the right

Lyrids 2014 - EARS Results

The EARS results are summarized in Fig. 5. I rely on the visual counting of the meteor radio echoes on the JPG images produced by SpecLab V 2.76 b10, distinguishing underdense radio echoes and overdenses radio echoes.

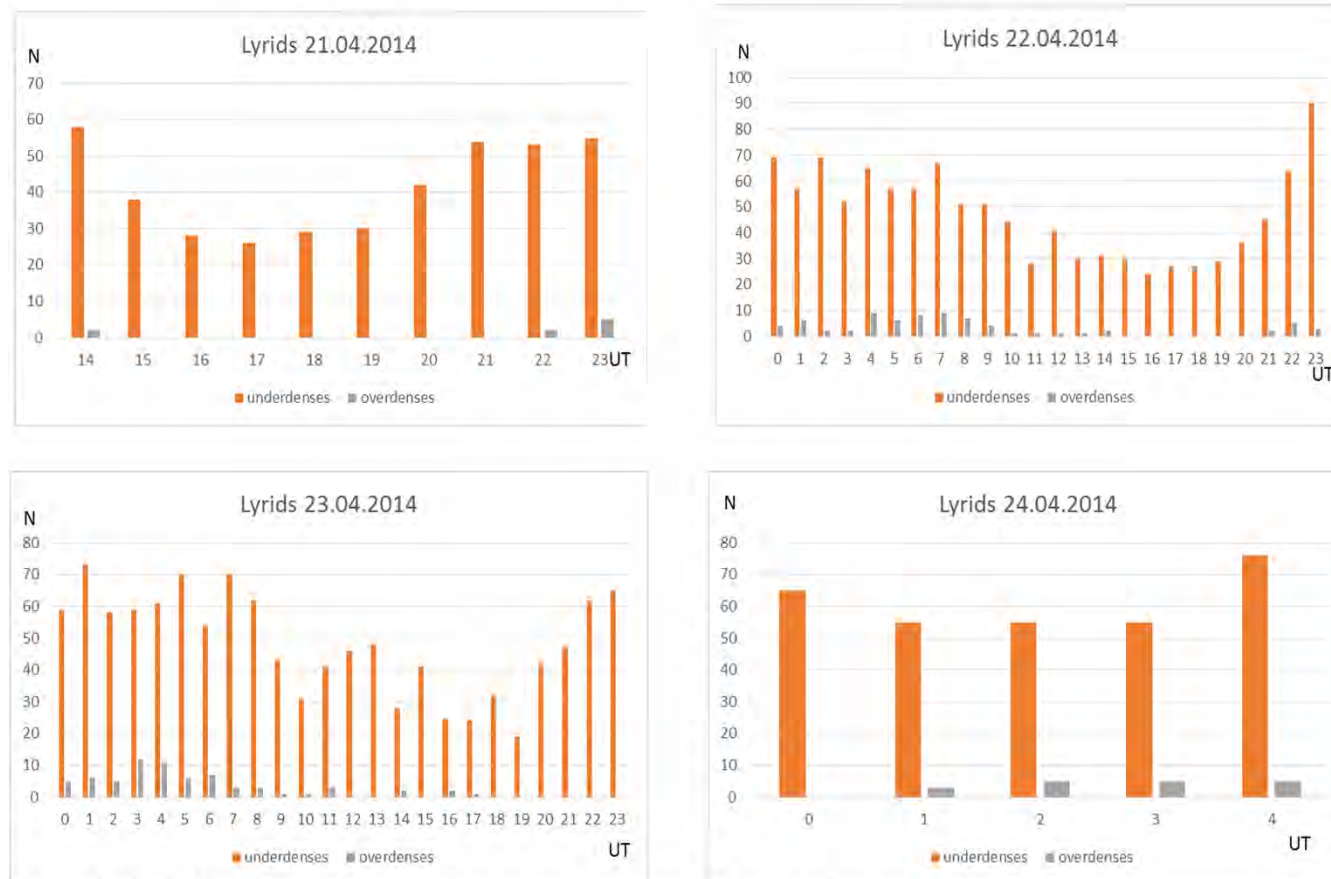


Fig. 5: EARS – Lyrids 2014 counting details (N number of echoes)

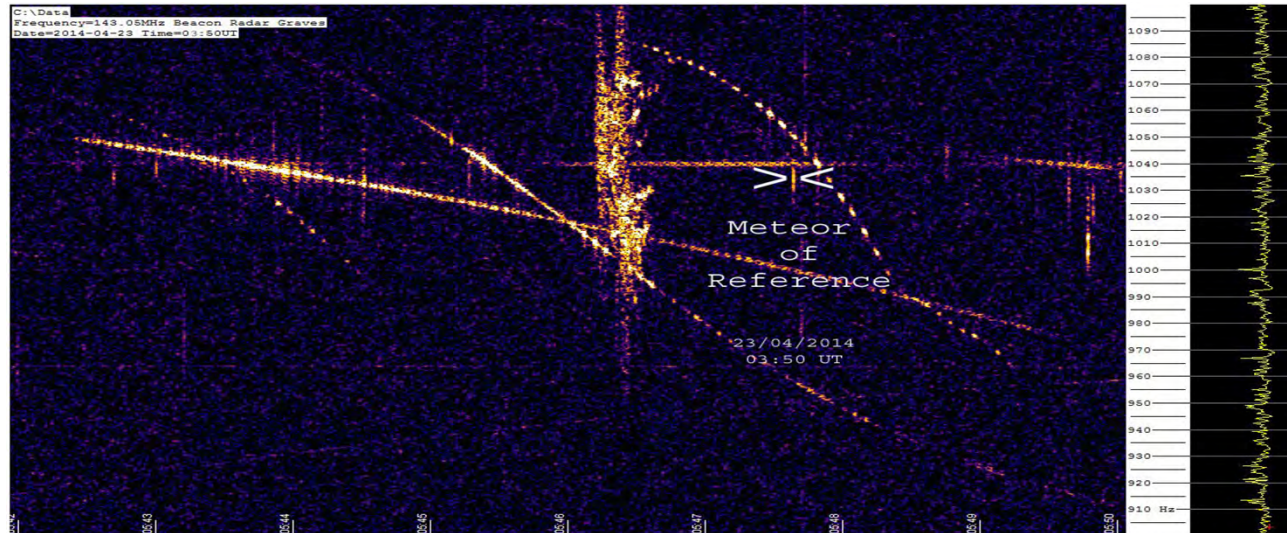


Fig. 6: EARS - Lyrids 2014 – 23/04/2014, 03.50 U.T. - airplanes radio echoes (arcuate traces), overdense radio echo in the middle, underdense radio echoes and underdense reference meteor echo

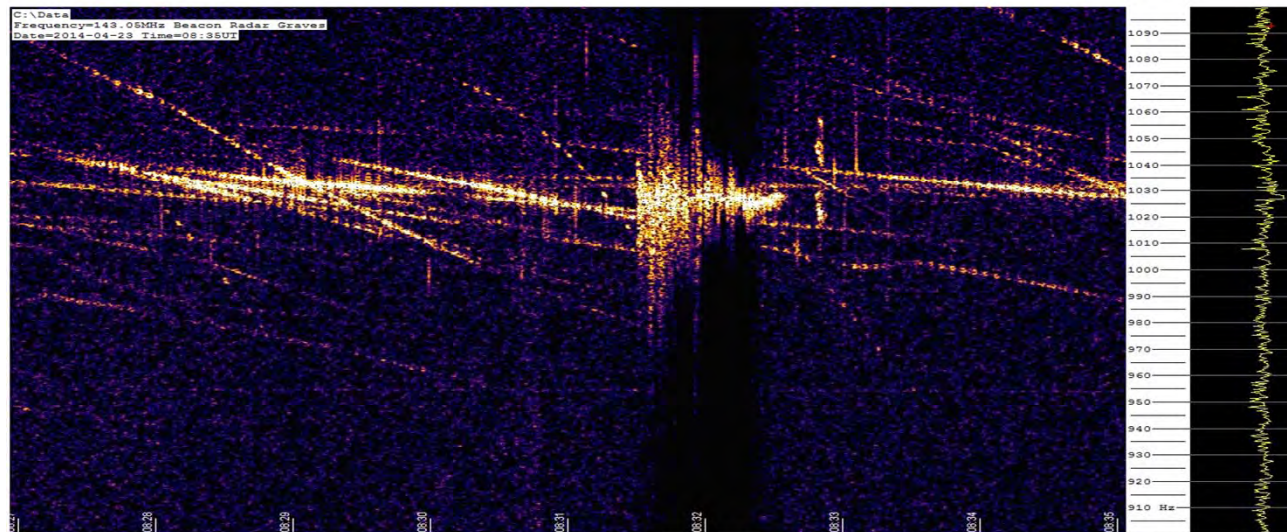


Fig. 7: EARS - Lyrids 2014 – 2014 – 23/04/2014, 06.35 U.T. - airplanes radio echoes (arcuate traces), overdense radio echo in the middle and underdense radio echoes

Discussion

- EARS (cf. Fig. 5) recorded a double max for the Lyrids 2014, a first max (cf. Fig. 5, better represented by the overdense radio echoes) on 22/04/2014 between 03:00 - 10:00 UT and a second max (cf. Fig. 5, better represented by the overdense radio echoes) on 23/04/2014 between 00:00 – 08:00. MARS, although not distinguishing between underdensities and overdensities radio echoes, confirmed the double max (cf. Fig. 2) although with different number of radio echoes. EARS detection of spectacular overdensities radio echoes like those in Figs 6-7 were not confirmed by MARS.
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- My EARS visual counts on the JPG images were surely contaminated by missing faint underdense and overdense radio echoes, and by missing meteor radio echoes hidden by the airplane radio echoes. But, apparently, the MARS automatic meteor counting program overlooked underdensities and overdensities radio echoes.

Camelopardalidis 2014 Radio Observation

- The Camelopardalids meteor shower was generated on 23-24/05/2014 by the passage of our Earth in the path of the debris of the comet 209P/Linear. EARS and MARS worked again in parallel on 23-25/04/2014 for a new combined observation campaign.

Camelopardalidis 2014 - MARS Results

The results of the MARS radio observations of the Camelopardalidis 2014 are summarised in Fig. 8.

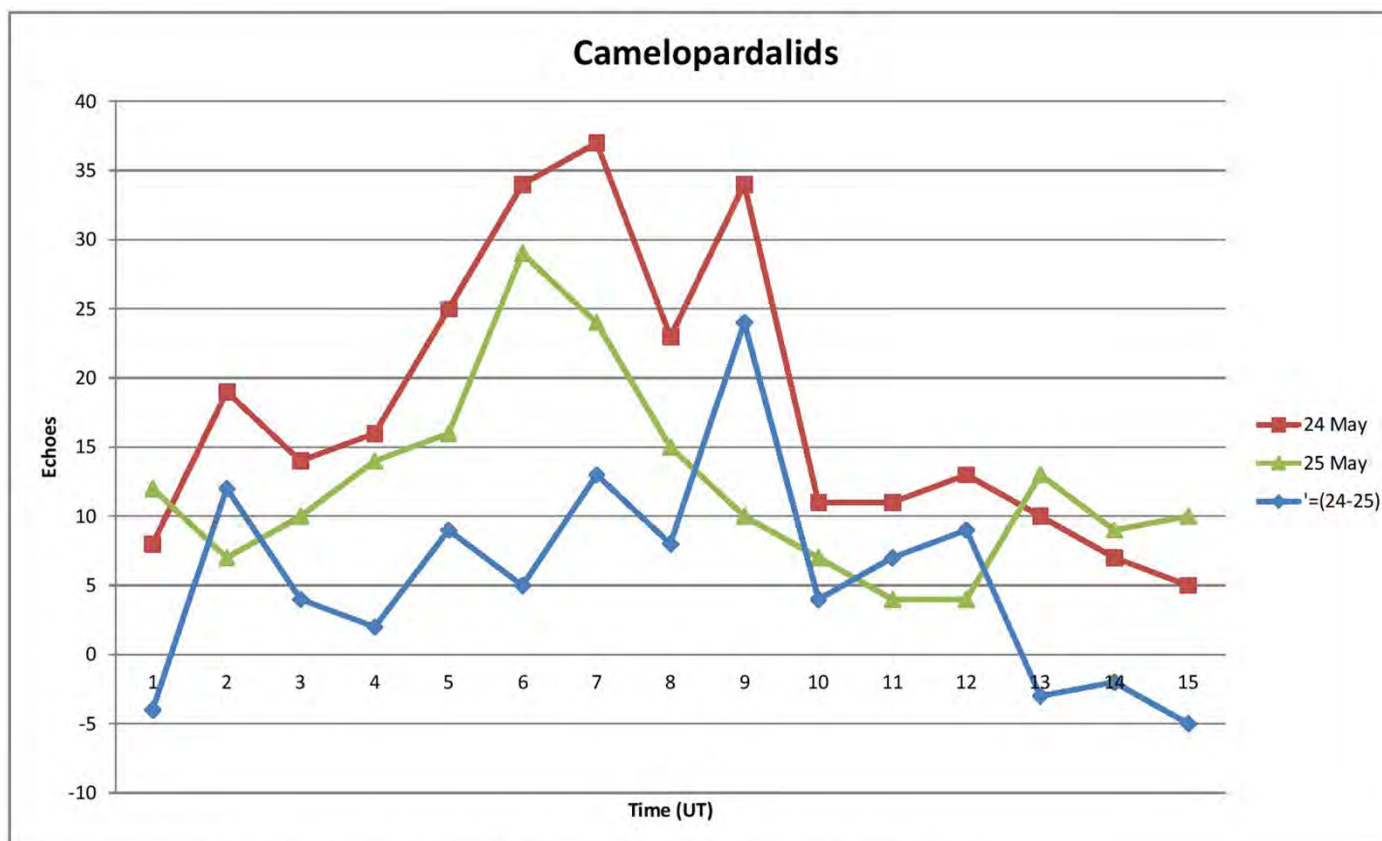
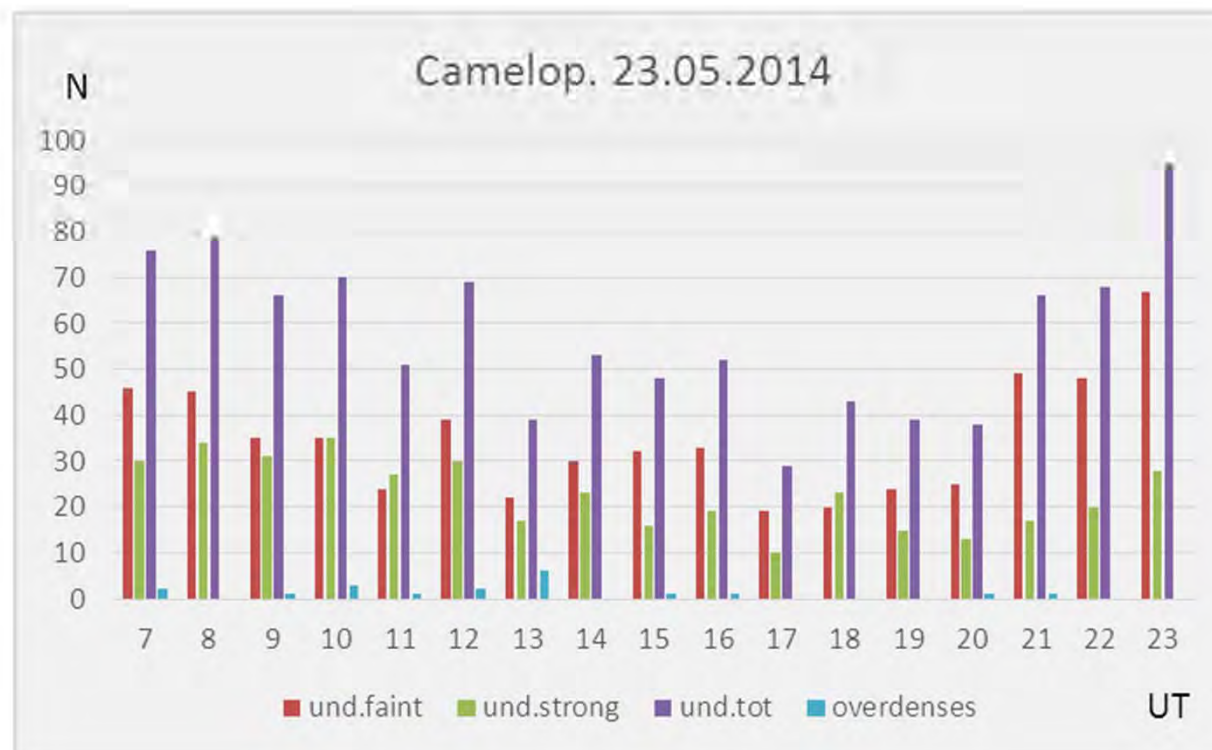


Fig. 8: MARS – Camelopardalidis 2014 counting details

Camelopardalidis 2014 - EARS Results

The results of the EARS radio observations of the Camelopardalidis 2014, by distinguishing between strong and faint radio echoes on the basis of the adopted underdense reference meteor echo (cf. Fig. 6), are summarised in Fig. 9,



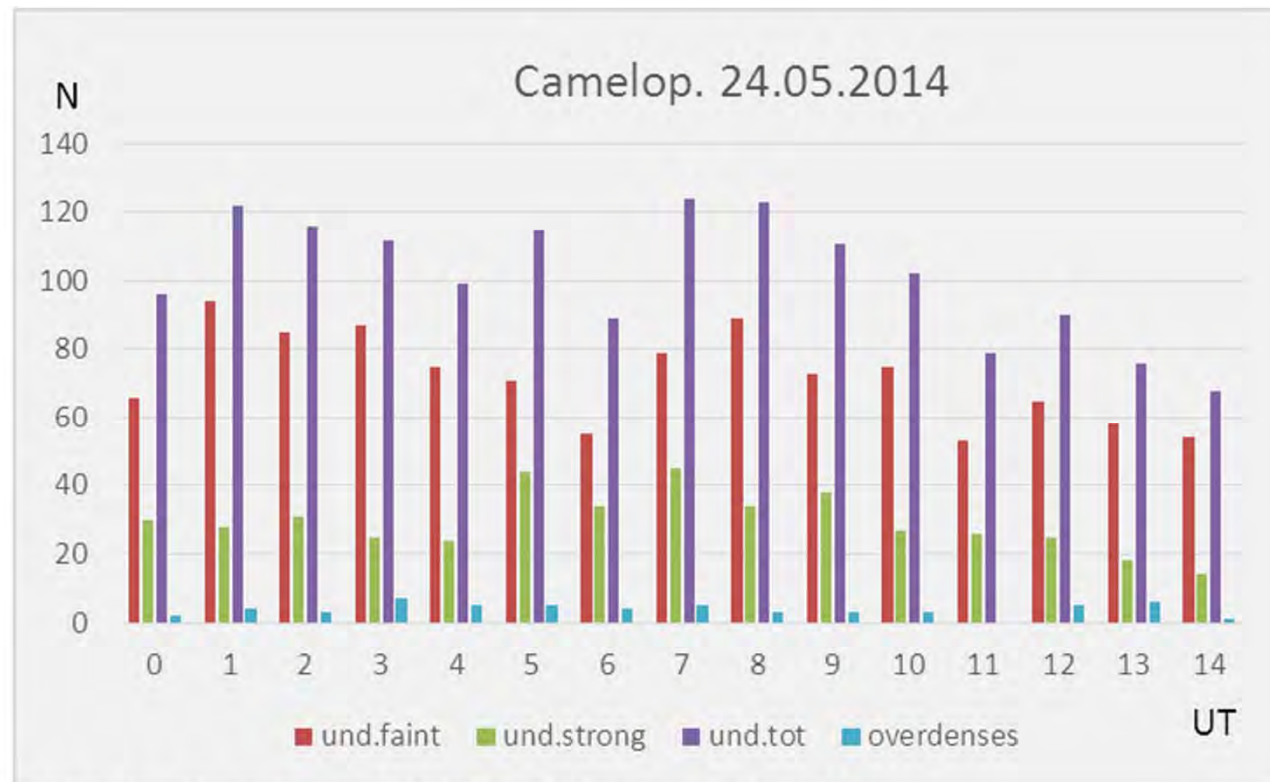


Fig. 9: EARS – Camelopardalidis 2014 counting details

Discussion

- EARS recorded a broad maximum for the Camelopardalidis 2014 (cf. Fig. 9, well represented by the total underdensities radio echoes and the overdense radio echoes) on 24/05/2014 between 01:00 - 11:00 UT. MARS (cf. Fig. 8) confirmed this broad max and indicated also a second max on 25/05/2014 between 03:00 - 11:00 UT.

Conclusion

- As expected, the radio observations results of EARS and MARS confirmed each other. However, further observations are necessary, as usual in the science, for estimating in the EARS radio observations the missing faint underdense and overdense radioechoes and the missing meteor radio echoes hidden by the airplane radio echoes, and for estimating in the MARS radio observations the underdense and overdense radioechoes missing because of the “behaviour” of the MARS automatic meteor counting program.

- **Acknowledgement**

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- I am grateful to Alexei Pace for having given me the permission of inserting the results of the Lyrids and Camelopardalidis 2014 MARS observations in the present article.

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- **Sources**

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- [1] http://fr.wikipedia.org/wiki/Radar_GRAVES ;
- [2] (http://www.antennepkw.com/1/j_pole_326922.html)
- [3] G. Tomezzoli, Progress on Radioastronomy in Munich (DE), IMC Proceedings 2013.