The Global Radio CAMs 2014

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Comet 209P/LINEAR stream

- May 24, 2014
- Radiant $\alpha = 122^\circ \delta = +79^\circ$
- Little daily movement $\rightarrow$ Observability Function not varying a lot
- Whole day coverage in Northern hemisphere
- Very slow (20 km/s with zenith attraction) $\rightarrow$ cfr Draconids 2011
‘Standard’ graph of hourly counts

Daily pattern
All May 2014 observations (45)
• not observed around May 24
• Erratic counts
Eliminate (-15)

- no data adjacent to May 24
## Remaining observations (20)

<table>
<thead>
<tr>
<th>Region</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td>11</td>
</tr>
<tr>
<td>North America</td>
<td>6</td>
</tr>
<tr>
<td>Japan</td>
<td>3</td>
</tr>
</tbody>
</table>

- Europe: 11
- of which GRAVES: 6
Grand Réseau Adapté à la Veille Spatiale
= Space debris tracking radar

Located near Dijon

Several MW, beam switching
GRAVES May 2014 observations
Combining GRAVES 2 observations

- Geometrical mean = $(n_1 n_2)^{1/2}$
- Consequence/advantage: one missing → ignore completely
Combining GRAVES 3 observations

Geometrical mean = \((n_1 n_2 n_3)^{1/3}\)
Combining GRAVES 6 observations

- Geometrical mean = \((n_1 n_2 \ldots n_6)^{1/6}\)
- Observed 1h UT to 13h UT
- Peak 7 – 8 h UT
- Stronger than eta Aquarids?
Combining GRAVES 6 observations

- Time domain
Simulation GRAVES 6 observations

- Simulated 11 h UT to 23h UT
- Simulated Peak  17 - 18 h UT
- Lower than eta Aqr, but more conspicuous
VVS beacon 4 observations

- Low power (50 W), observers 10 to 120 km from transmitter
- Verbelen: overdense only, low number
- CAMs visible, but less pronounced
Japan 3 observers

- Hardly seen
- Why?
Single observers

- BIRA beacon 250 W
- Observer 500 km SW
- positive

- Reference observer last 2 years
- hardly seen

- Jeff
- yes
Detailed reflections

‘epsilon’

Chris

Jeff
Stream arrival geometry

Width (horizontal) ≈ 8000 km

Diff travel time (orthogonal) < 1 min
Visual comparison

http://www.imo.net/live/cameleonradialids2014/
Conclusion

CAMs activity detected with forward scatter observations

Most successful: Graves automated counts

Activity period of smaller particles: May 24, 1h – 13h UT

Peak activity and larger particles: May 24, 7h – 9h UT
PARTICLE FOUND

Measuring the momentum of photon pairs produced in collisions at the Large Hadron Collider revealed a suspicious bump— one line of evidence for a new particle.

Number of events

OBSERVED

EXPECTED

Mass (gigaelectronvolts)

Calculated from photon momenta

STREAM FOUND

[Graph showing data points for 23 May, 24 May, and 25 May]
Thanks to / acknowledgments

- The rmob.org contributors
- Pierre Terrier
- Jeff Brower
- (meteorobs) mailing list
- IMO

- A GRAVES Sourcebook
- Mikhail Maslov Fig. 3. The Earth as seen from coming 209p-ids meteors