Combined determination of stream activity and Observability Function

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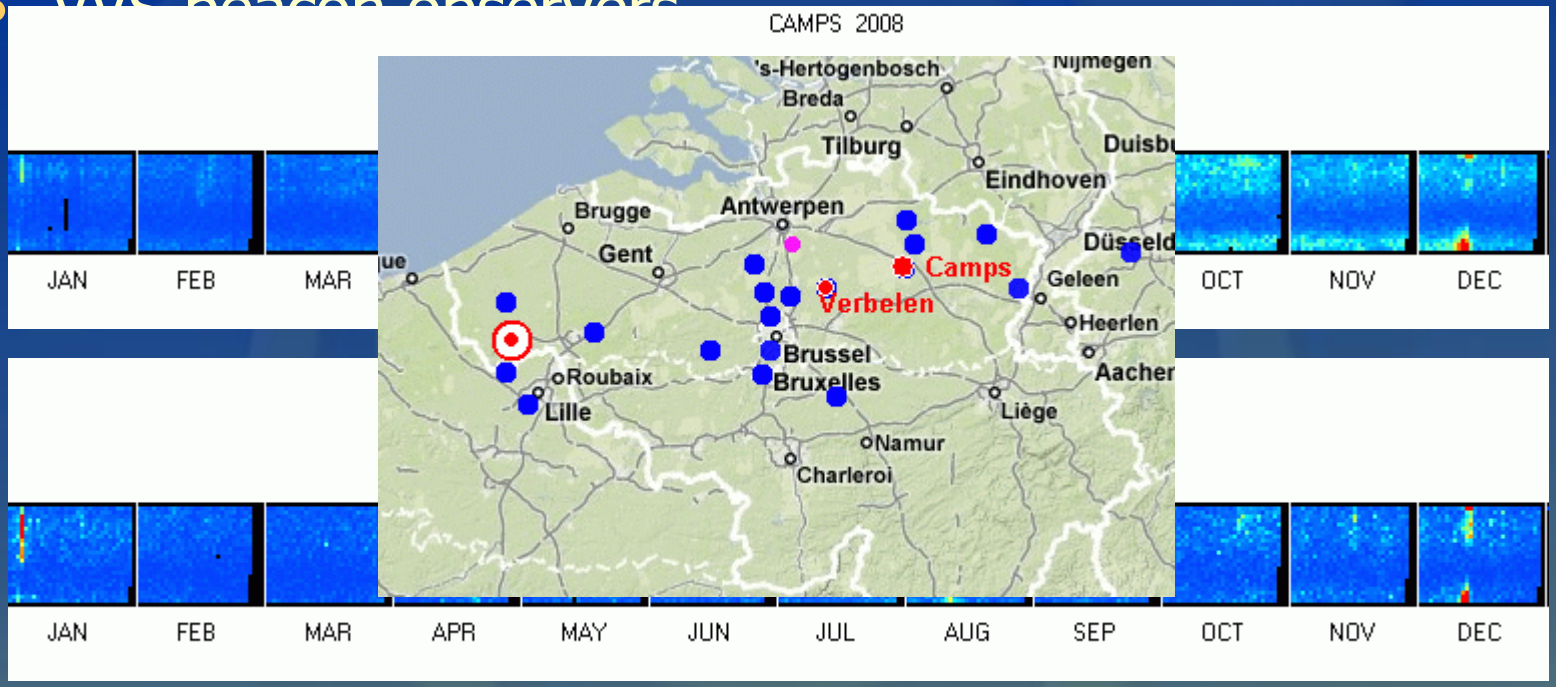
One year of radio meteor counts

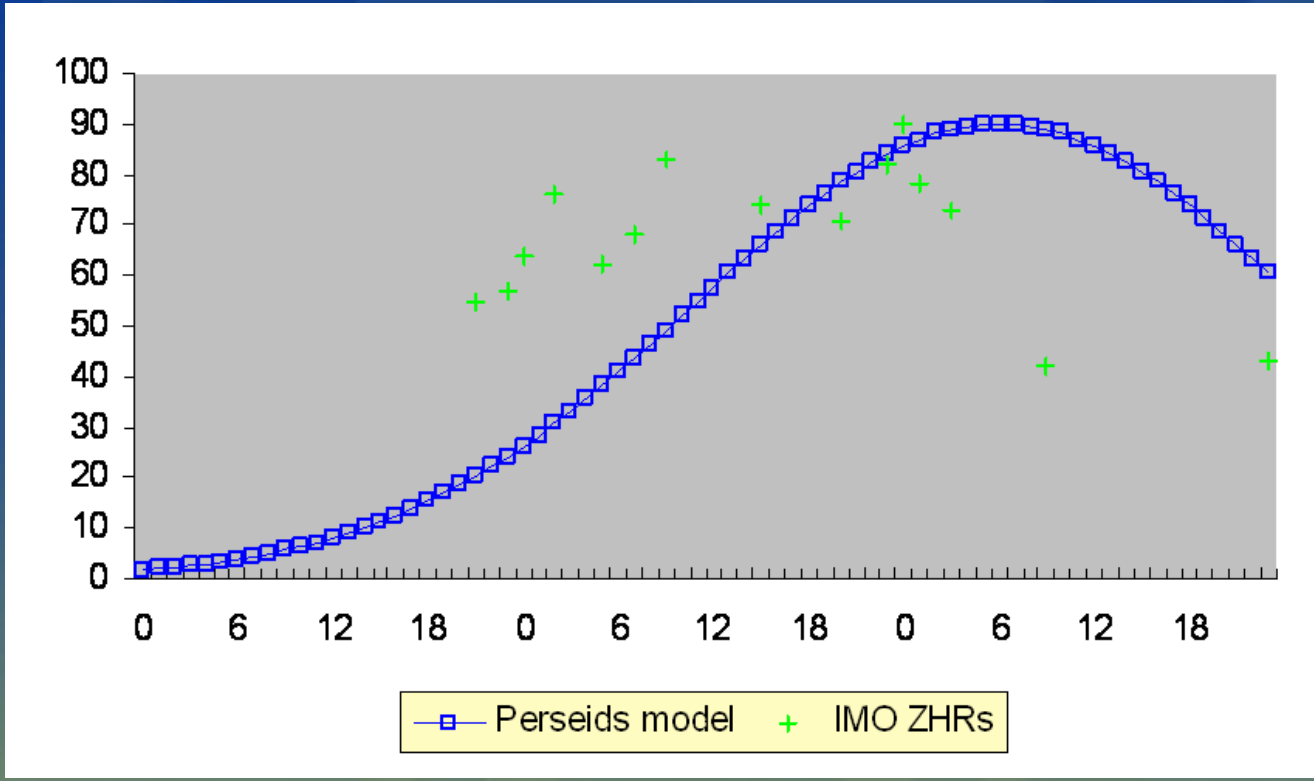
- VVS beacon observers



- Sporadics versus streams
- Reliable ?

IMC2005 presentation

Gaspard De Wilde Perseids 2005



Reference

- **A numerical** method **to aid in the combined determination of stream activity and Observability Function**

  Steyaert, Christian; Brower, Jeffrey; Verbelen, Felix

  WGN, Journal of the International Meteor Organization, vol. 34, no. 3, p. 87-93

Метод Стиерта
Предложенный метод анализа данных любительских радионаблюдений метеорных потоков был предложен Кристианом Стиертом (Christian Steyaert) в 2005 году на Международной метеорной конференции в Оостмале (Oostmall), Бельгия, и детально описан в статье [*Christian Steyaert, Jeffrey Brower, and Felix Verbelen, WGN, the Journal of the IMO 34:3 (2006)*]. Рассмотрим суть этого метода.

Some maths

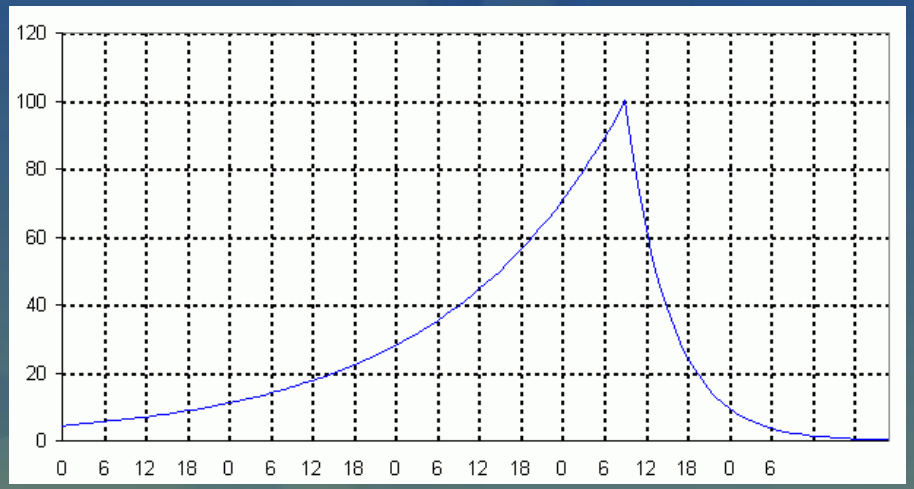
$$O(t) = S(T) + Z(t)OF(T)$$

$$T = \frac{t - t_0}{D}$$

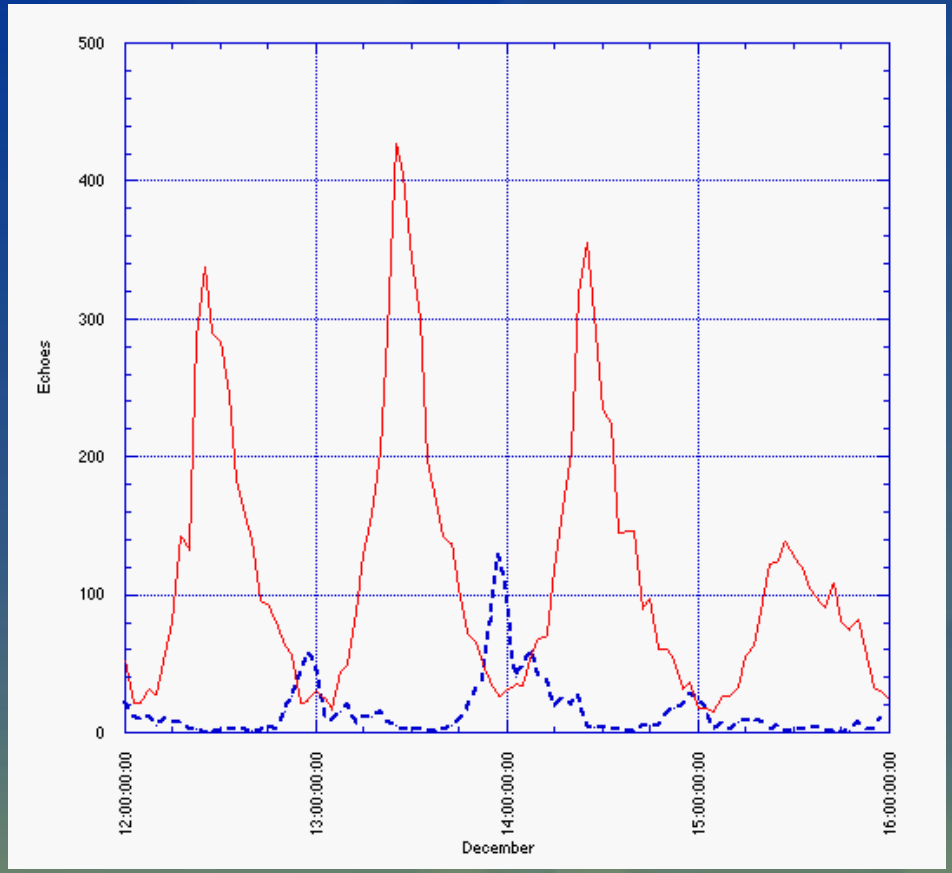
$$Z(t) = e^{-(t-t_M)/a}$$

$$Z(t) = e^{-(t_M-t)/b}$$

O	observed ‘activity’
S	sporadic background
Z	stream profile
OF	Observability Function
t_M	instance of maximum
a	rise time constant
b	decay

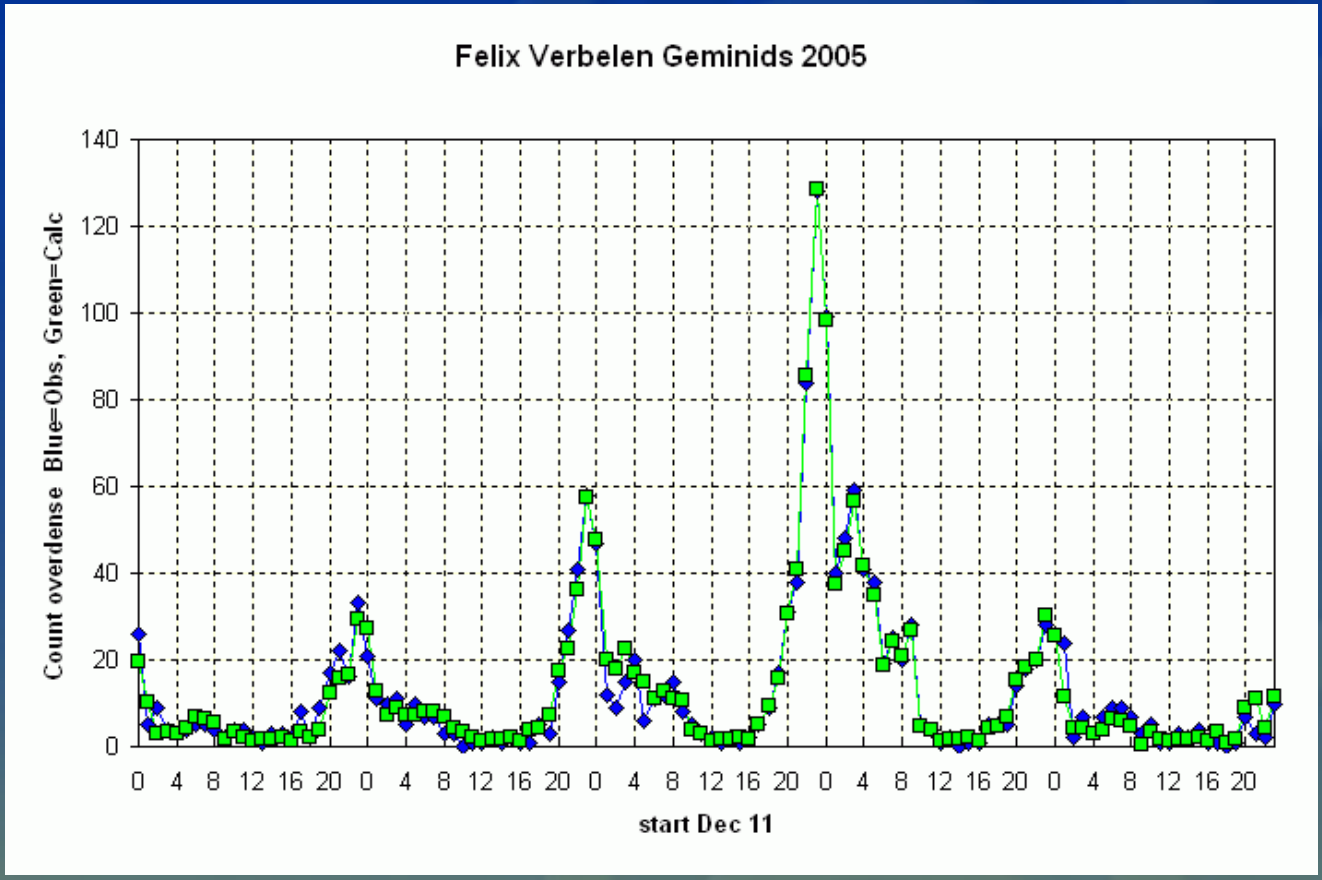


Geminids 2005



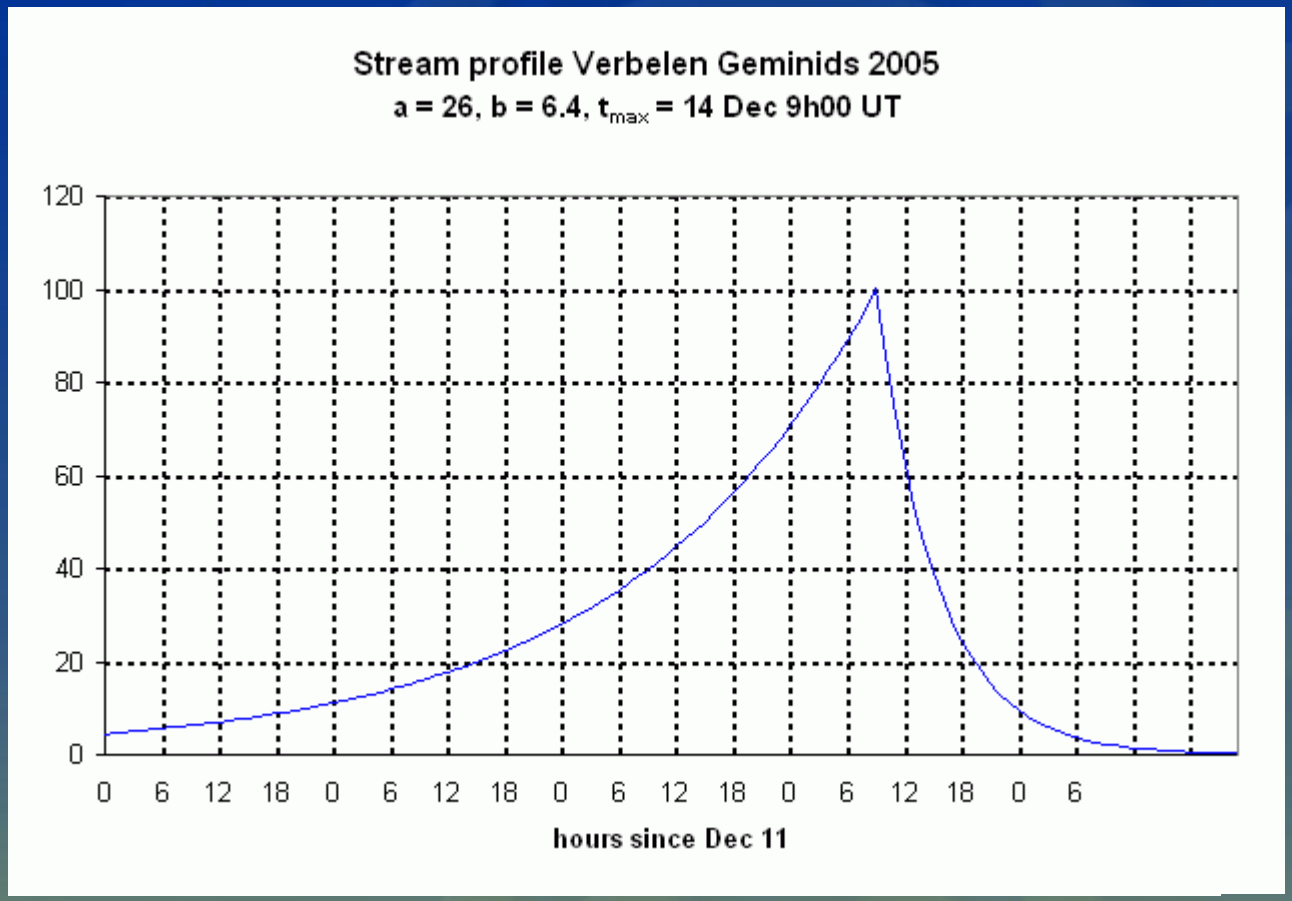
Brower
Verbelen

Geminids 2005



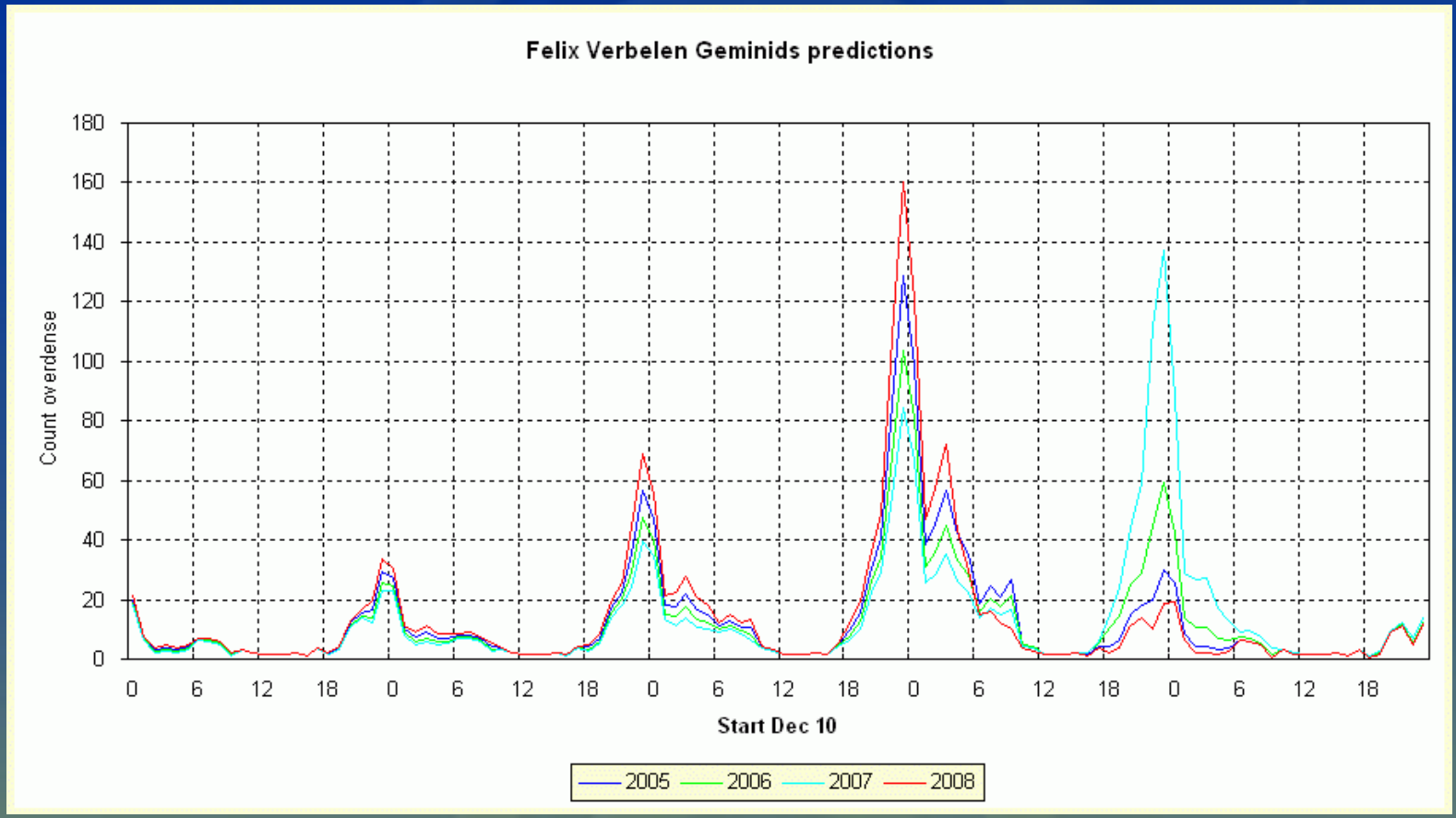
Observed =
Sporadic + Stream * ObsF

Geminids 2005

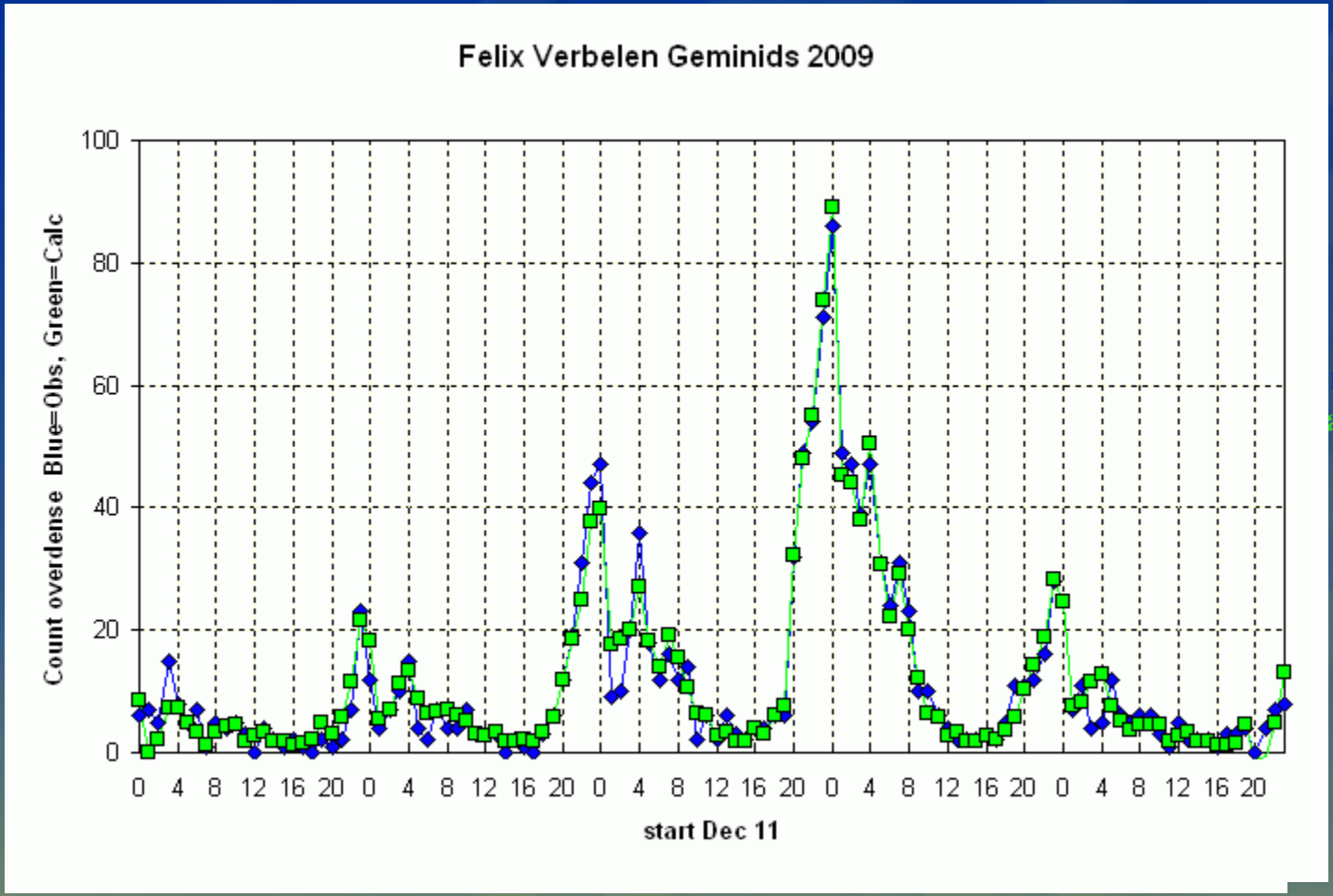


Obs F
Sporadic

Geminids predictions

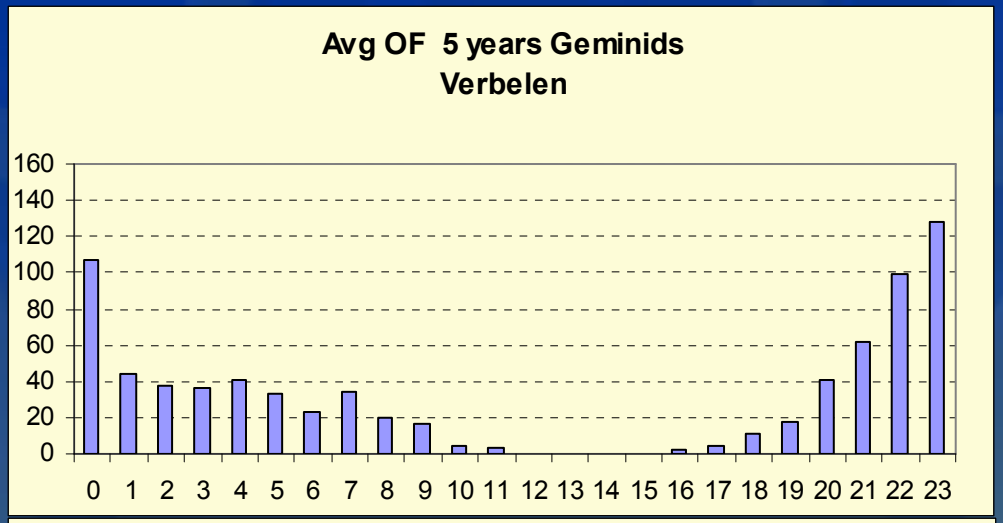


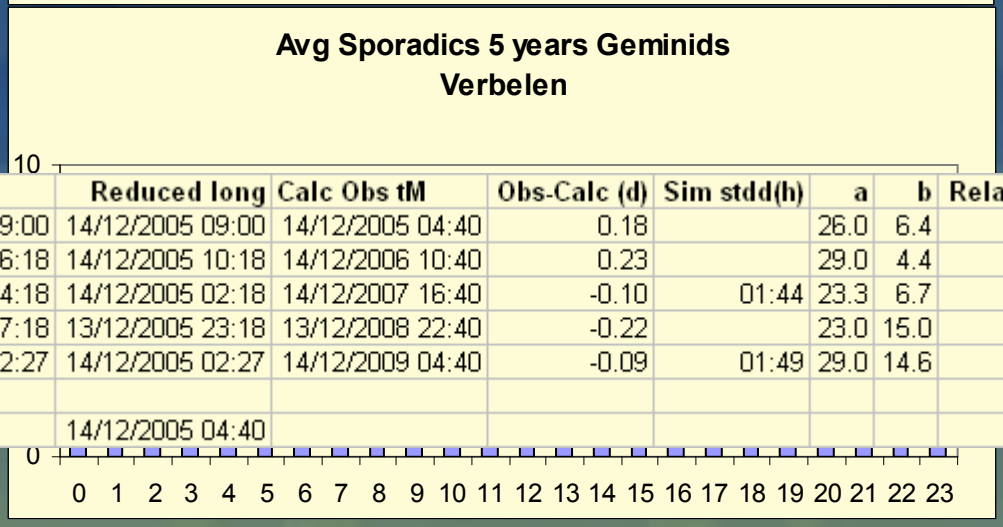
Geminids 2005-2009



rved =
adic + Stream * ObsF

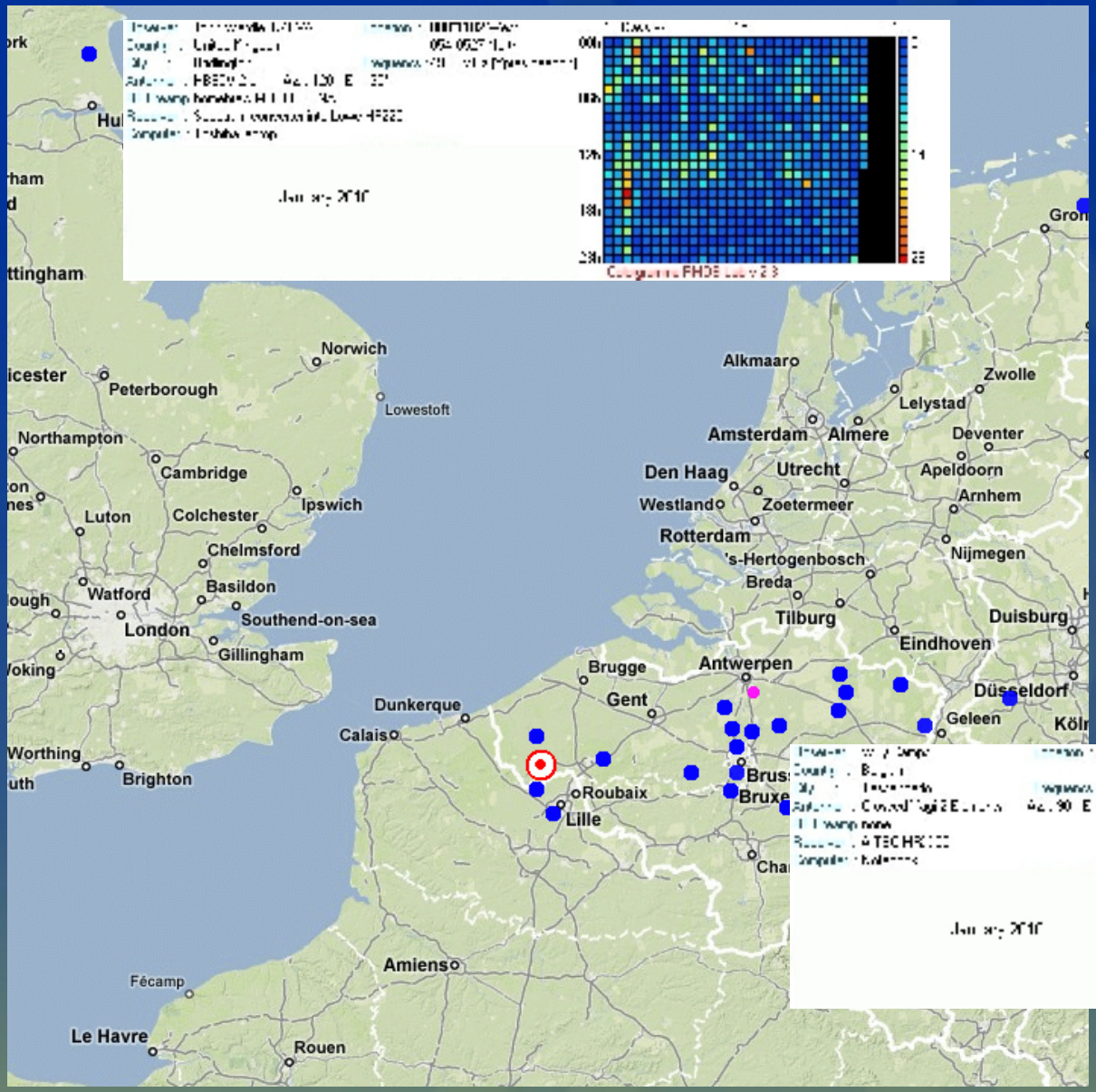
Geminids 2005-2009





Obs tM	Reduced long	Calc Obs tM	Obs-Calc (d)	Sim stdd(h)	a	b	Relat strength
14/12/2005 09:00	14/12/2005 09:00	14/12/2005 04:40	0.18		26.0	6.4	1.14
14/12/2006 16:18	14/12/2005 10:18	14/12/2006 10:40	0.23		29.0	4.4	1.23
14/12/2007 14:18	14/12/2005 02:18	14/12/2007 16:40	-0.10	01:44	23.3	6.7	0.88
13/12/2008 17:18	13/12/2005 23:18	13/12/2008 22:40	-0.22		23.0	15.0	0.83
14/12/2009 02:27	14/12/2005 02:27	14/12/2009 04:40	-0.09	01:49	29.0	14.6	0.91
	14/12/2005 04:40						

Observed versus true maximum



Conclusions / the future

- Combined stream and OF method works
  - well in the easiest case: major stream, one maximum
  - not as good in the other cases
- Solutions / possibilities
  - re-utilise the determ observer
  - combine observatio
    - non analytical m
      - AI, esp. neu
- Growing network

Thanks to

- Felix Verbelen
- David Entwistle
- Willy Camps
- Jeff Brower
- Astrolab IRIS, Zillebeke
- VVS