SCAMPI - Single Camera Measurement of the Population Index

Work in progress

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SCAMPI: Development of a Project

4CAMPI: Perseids 2016; 4-Camera Measurement of the Population Index — Failed

SCAMPI 1.0: Perseids 2016: Single Camera Measurement of the Population Index — Provocing results

3CAMPI: Perseids 2018: 3-Camera Measurement of the Population Index — Work in progress

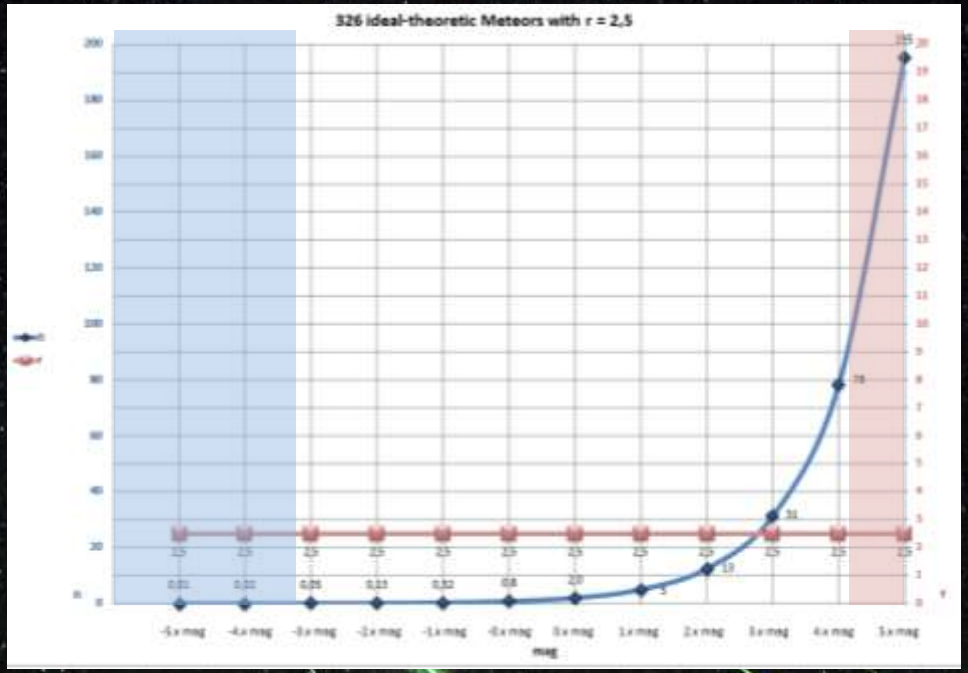
SCAMPI 2.0: Geminids 2018: Single Camera Measurement of the Population Index — Future

Population Index Theory

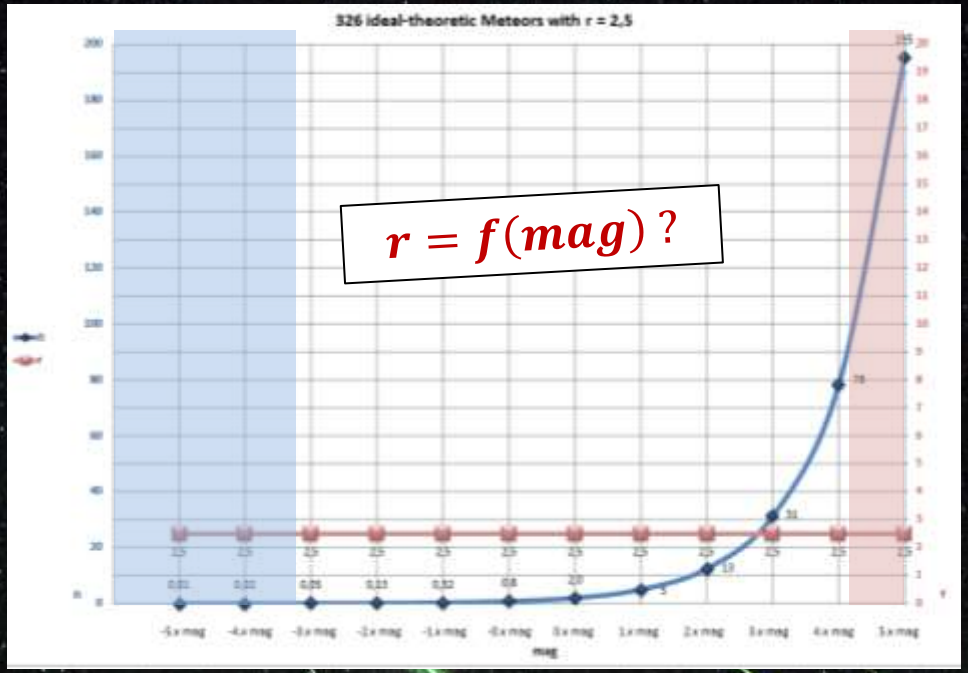
$$r = \frac{n_{X+1\ mag}}{n_{X\ mag}}$$

- The PI is an observational factor
- The PI describes the magnitude distribution of meteor streams
- The PI is a constant
- The PI is mostly between 2,0 and 3,0
- The PI is needed to calculate the Zenital Hourly Rate

Ideal-theoretic Population Index



Critique of the Population Index



- The „PI“ cannot be constant because this would mean an infinite number of ever fainter meteors
- The „PI“ does not describe the true brightness distribution of meteor streams correctly
- The „PI“ is mostly between 2,0 and 3,0 because of circular arguments

4CAMPI: Perseids 2016 Failed

4 detecting thresholds:

Cam 1: Canon ME20S-FH
ISO 1.400.000
F = 2.0
Reference sensitivity

Cam 2: Canon ME20S-FH
ISO 175.000
F = 2.0
- 3 stops

Cam 3: Sony α7S
ISO 160.000
F = 5.6
- 6 stops

Cam 4: Sony α7S
ISO 20.000
F = 5.6
- 9 stops

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SCAMPI 1.0: Perseids 2016

Cam 1: Canon ME20S-FH
ISO 1.400.000
25 fps
f = 35 mm
F = 2.0

6:25 hours video records,
analyzed with MetRec by Sirko Molau:

906 Meteors over all, among them

549 Perseids

287 Sporadics and Anthelions

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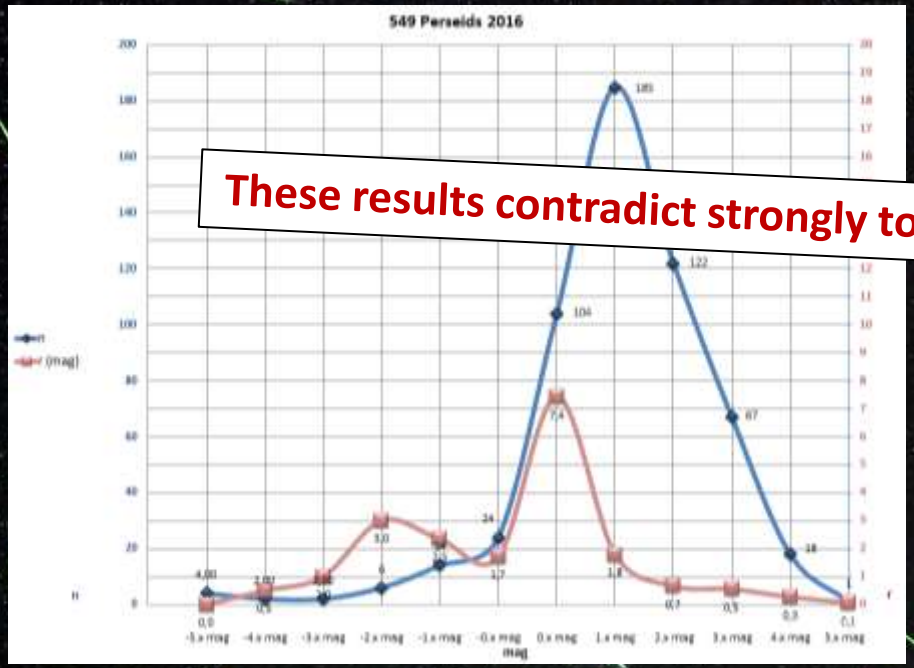
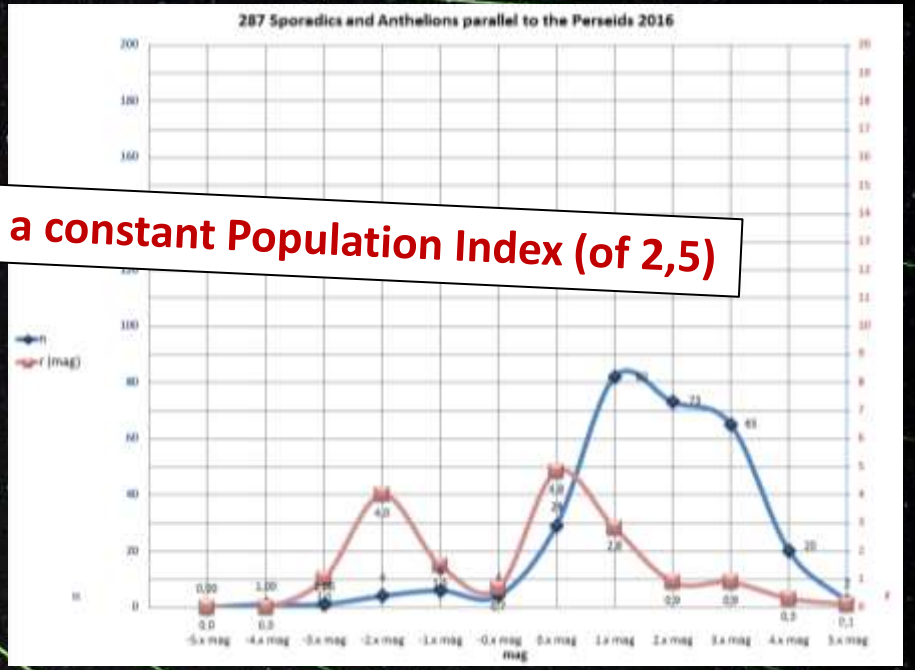
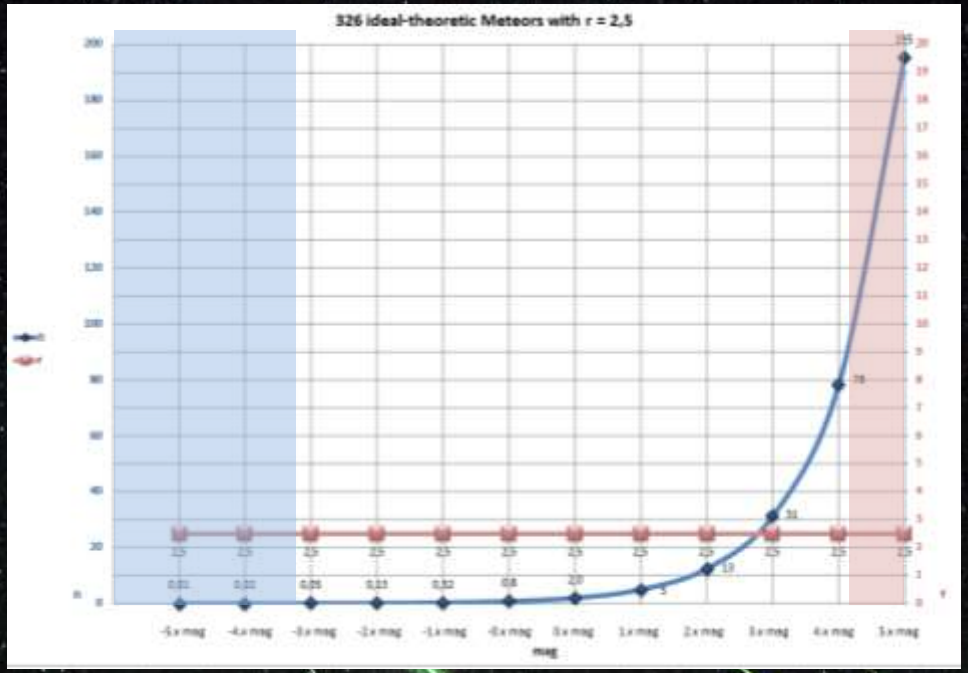
SCAMPI 1.0: Perseids 2016



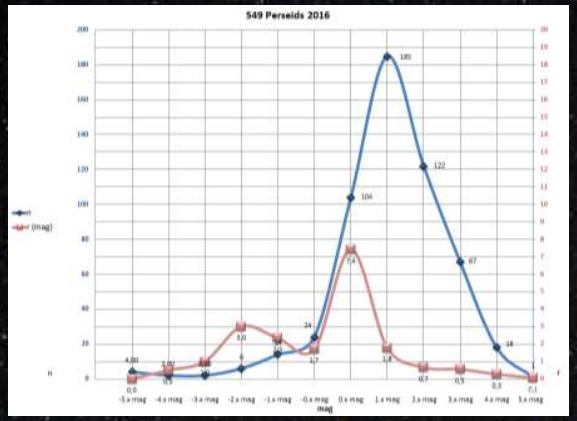


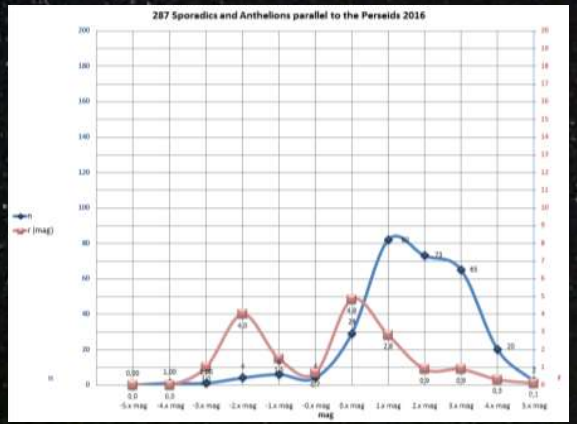
These results contradict strongly to a constant Population Index (of 2,5)

Ideal-theoretic Population Index



SCAMPI 1.0: Four Interpretations





1 a: Error from meteor photometry

1 b: Error from meteor detection

2 a: Real result: The Perseids 2016 were extraordinary

2 b: Real result: There is no constant PI

3SCAMPI: Perseids 2018

3 detecting thresholds:

3x Sony α7S,
all set to
25 fps
T= 1/25 s
ISO 409.000

with identical lenses:
Canon FD 1.4/50mm
F = 1.4

3 sensitivity thresholds via grey filters:
Cam 1: no filter
Cam 2: ND 0.6 filter, - 2 stops
Cam 3: ND 1.2 filter, - 4 stops

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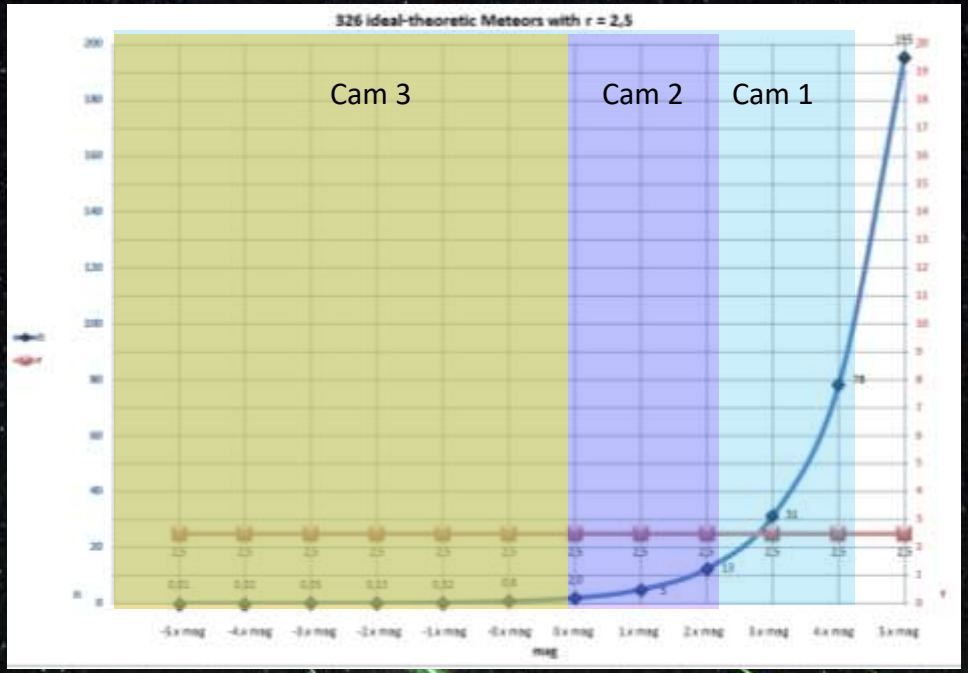
3SCAMPI: Perseids 2018



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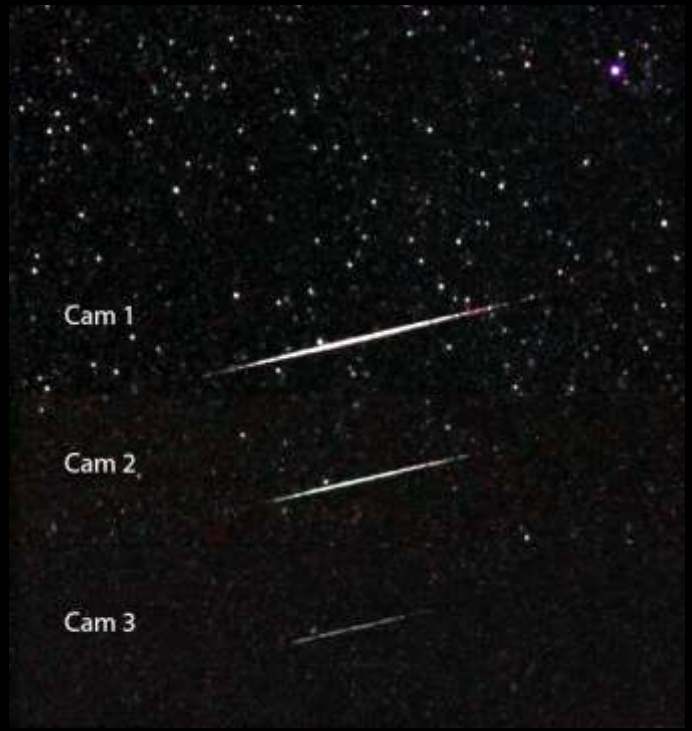
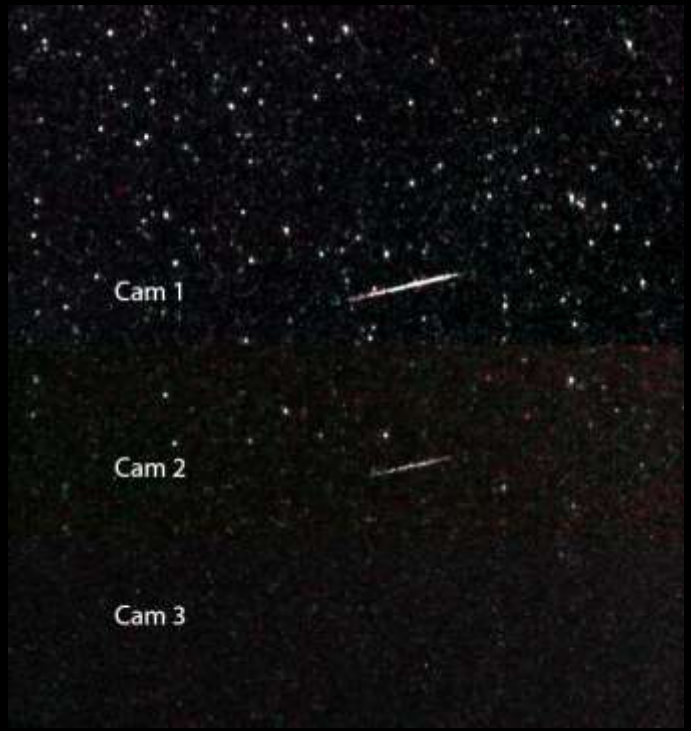
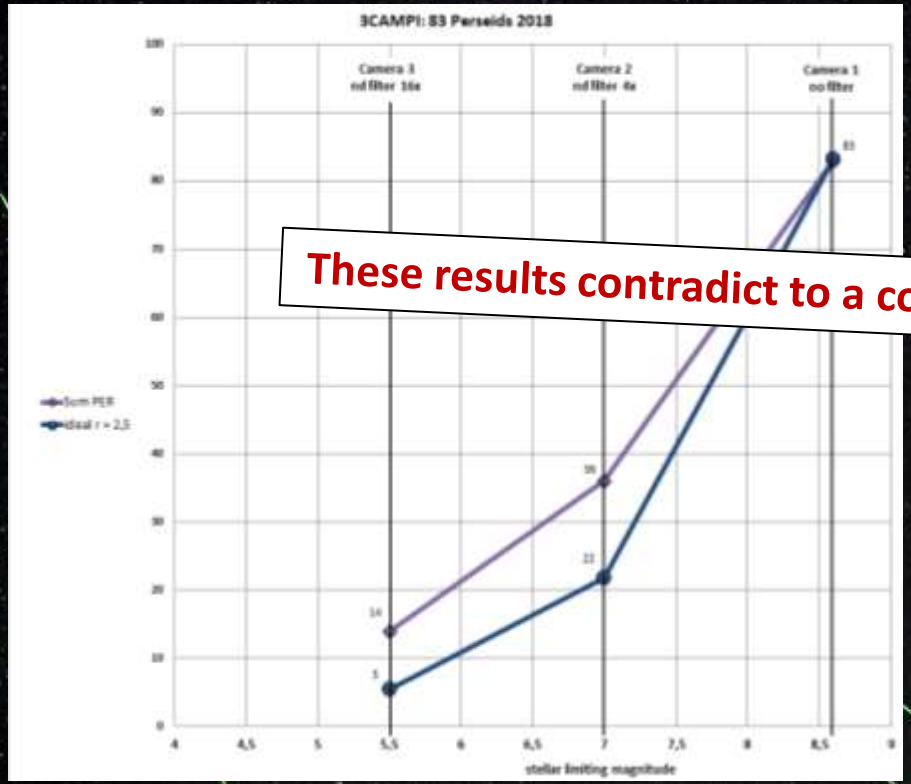
3SCAMPI: Perseids 2018

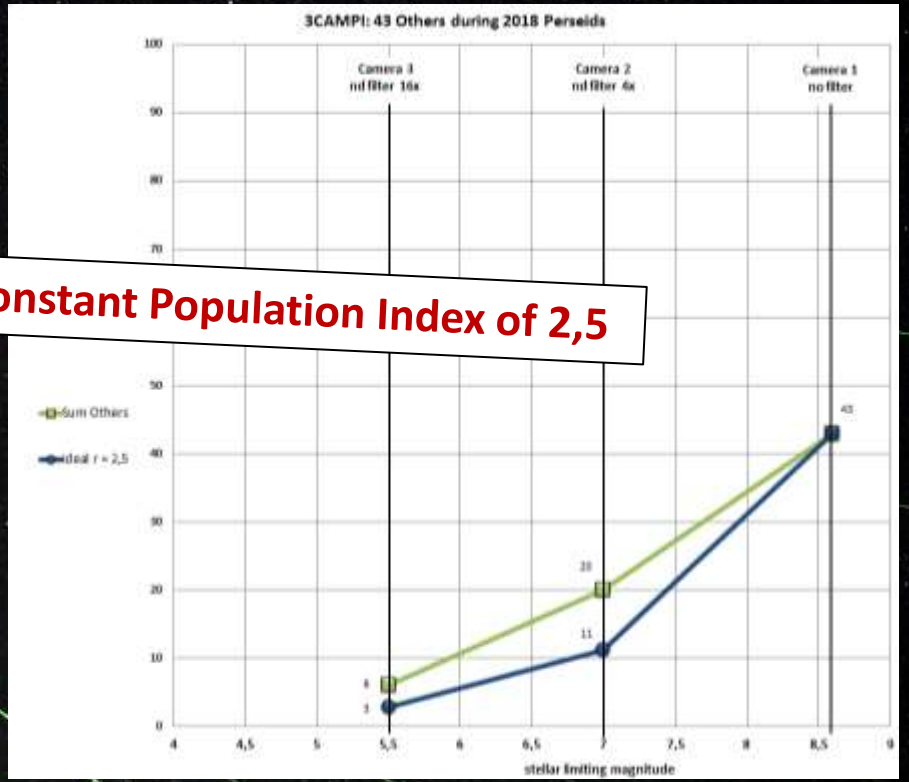
3 detecting thresholds





3SCAMPI: Perseids 2018 first draft results





These results contradict to a constant Population Index of 2,5

Conclusions

- Circular observatory effects for should be considered
- Instead of a constant Population Index the definition of a variable **„Brightness Distribution Function“** *x = f (mag)* seems to be appropriate
- Especially faint meteors should be investigated
- Meteor video observations with high sensitivity, high resolution and wide field are required
- Parallel or sequencial multi-camera observations with different ND filters can avoid the detection threshold problem

Outlook: **SCAMPI 2.0**

ARRI Alexa Mini
Professional film camera

with high speed film lens

Zeiss Superspeed 1.3/18mm

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Outlook: **SCAMPI 2.0** Geminids 2018 ??

ARRI Alexa Mini
Professional film camera

with high speed film lens

Zeiss Superspeed 1.3/18mm

Fast liquid crystal element in the lens mount, synchronized with the sensor output

> Fast changing ND filter, resulting in an exposure sequence film recording

> 3 or 4 sequencial detecting thresholds

Meteor Detecting Efficiency of Video Cameras

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- Bernd Gährken for his support with the 4CAMPI and 3CAMPI observations
- Sirko Molau for his support with the data analysis and his ideas for SCAMPI
- Felix Bettonville for his valuable input

Thank You very much for Your Attention!

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