Influence of the pointing direction and detector sensitivity variations on the detection rate of a double station meteor camera

Thomas Albin[1,2], Detlef Koschny[3,4], Gerhard Drolshagen[3], Rachel Soja[1], Ralf Srama[1] and Bjoern Poppe[2]

(1) Institute for Space Systems, Stuttgart, Germany
(2) University of Oldenburg, Oldenburg, Germany
(3) European Space Agency, Nordwijk, The Netherlands
(4) Chair of Astronautics, Technical Univ. Munich, Garching, Germany

Outline

1. Introduction
2. Pointing-dependent bias
3. CILBO's camera sensitivity
4. Summary / Outlook

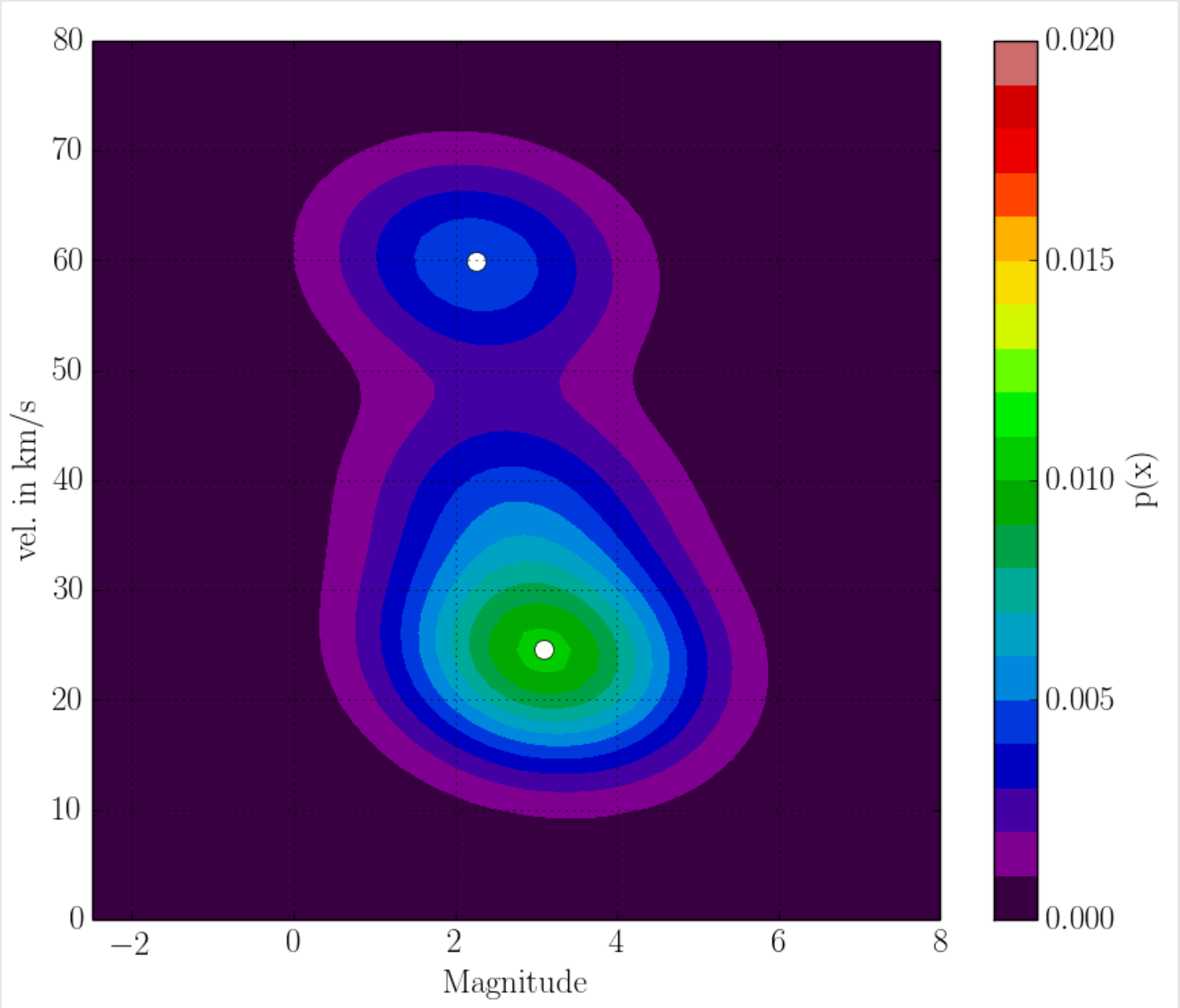
1 Introduction

- First scientific results regarding mass flux and velocity distribution by:
  - Drolshagen *et al.* 2014: "Meteor velocity distribution from CILBO double station video camera data"
  - Ott *et al.* 2014: "Meteoroid flux determination using image intensified video camera data from the CILBO double station"

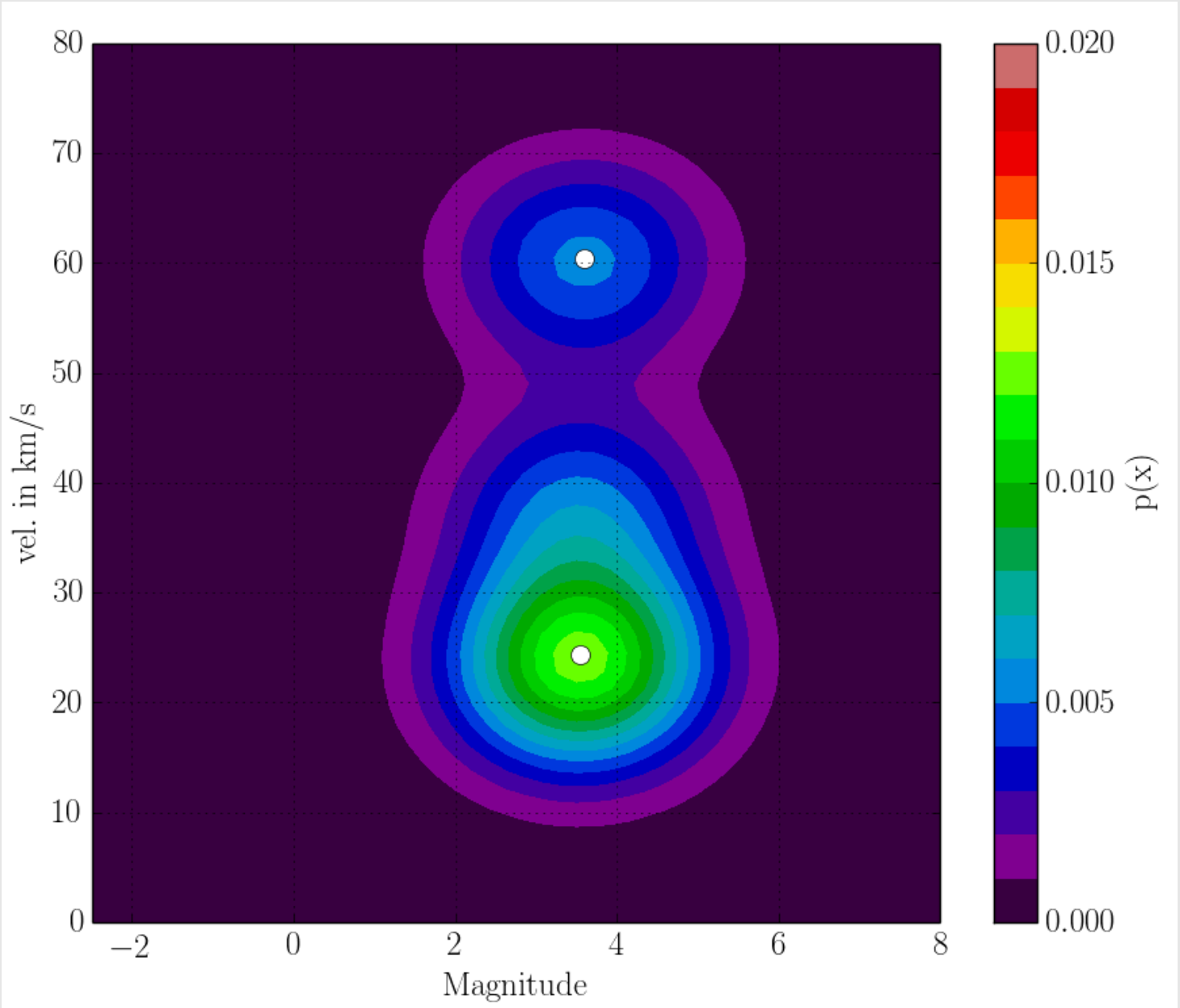
1 Introduction

- Observational Astronomy has "too much" bias...
  - Malmquist Bias
  - Bias in the optical and electronic system
  - Interstellar Dust and Gas
  - ...
- What about meteor cameras?!

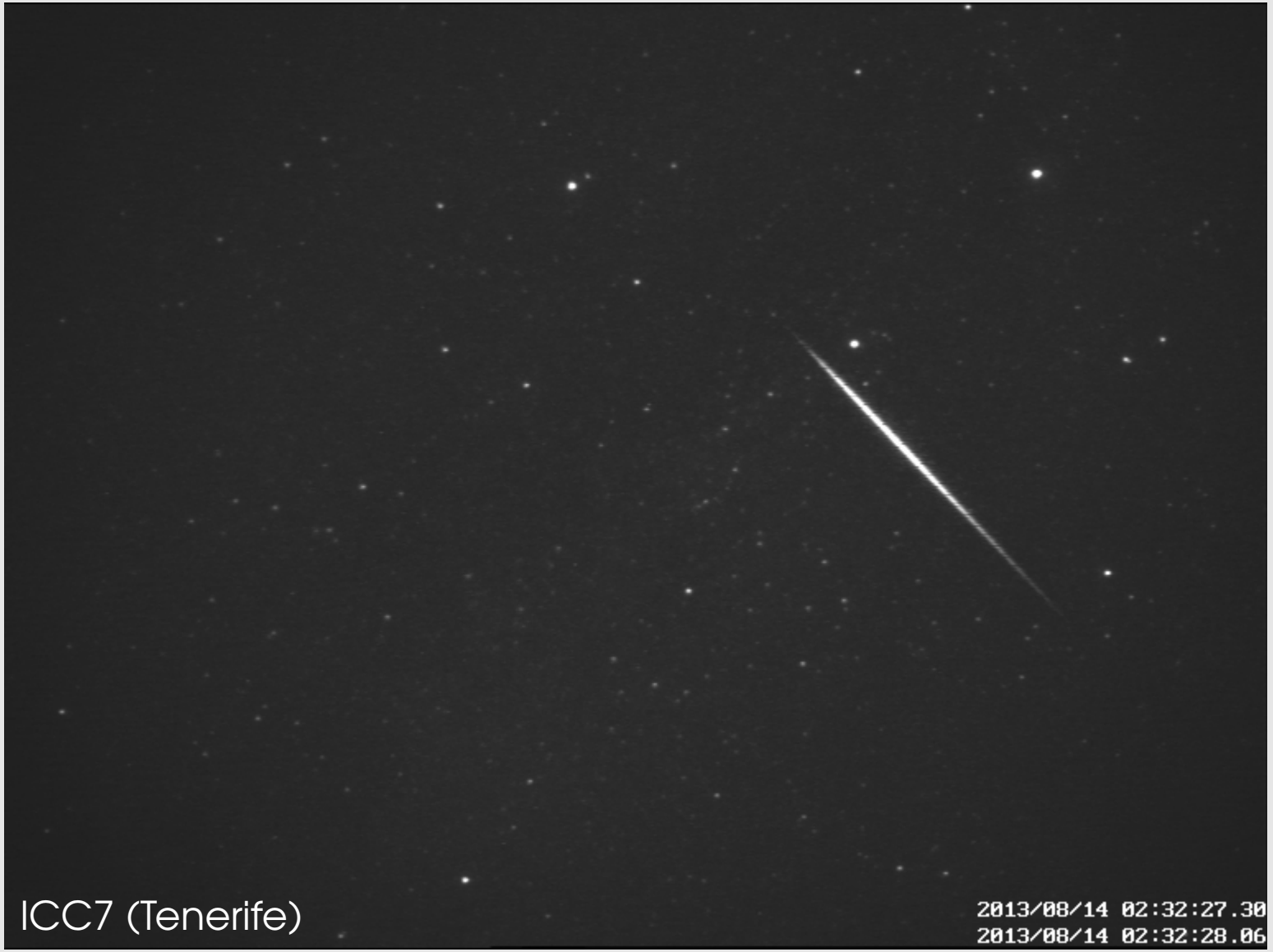
2 Point.-dep. bias



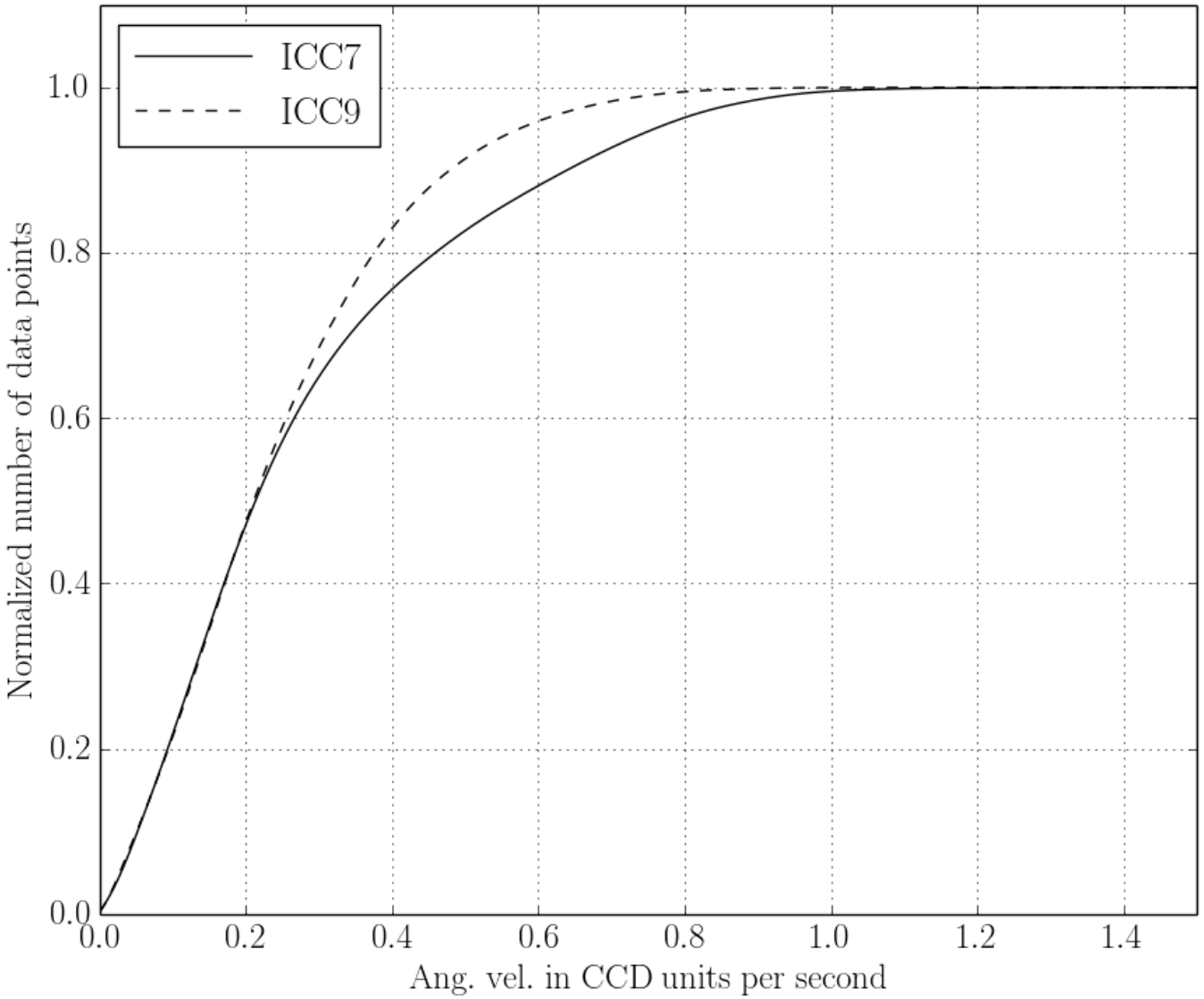
2 Point.-dep. bias



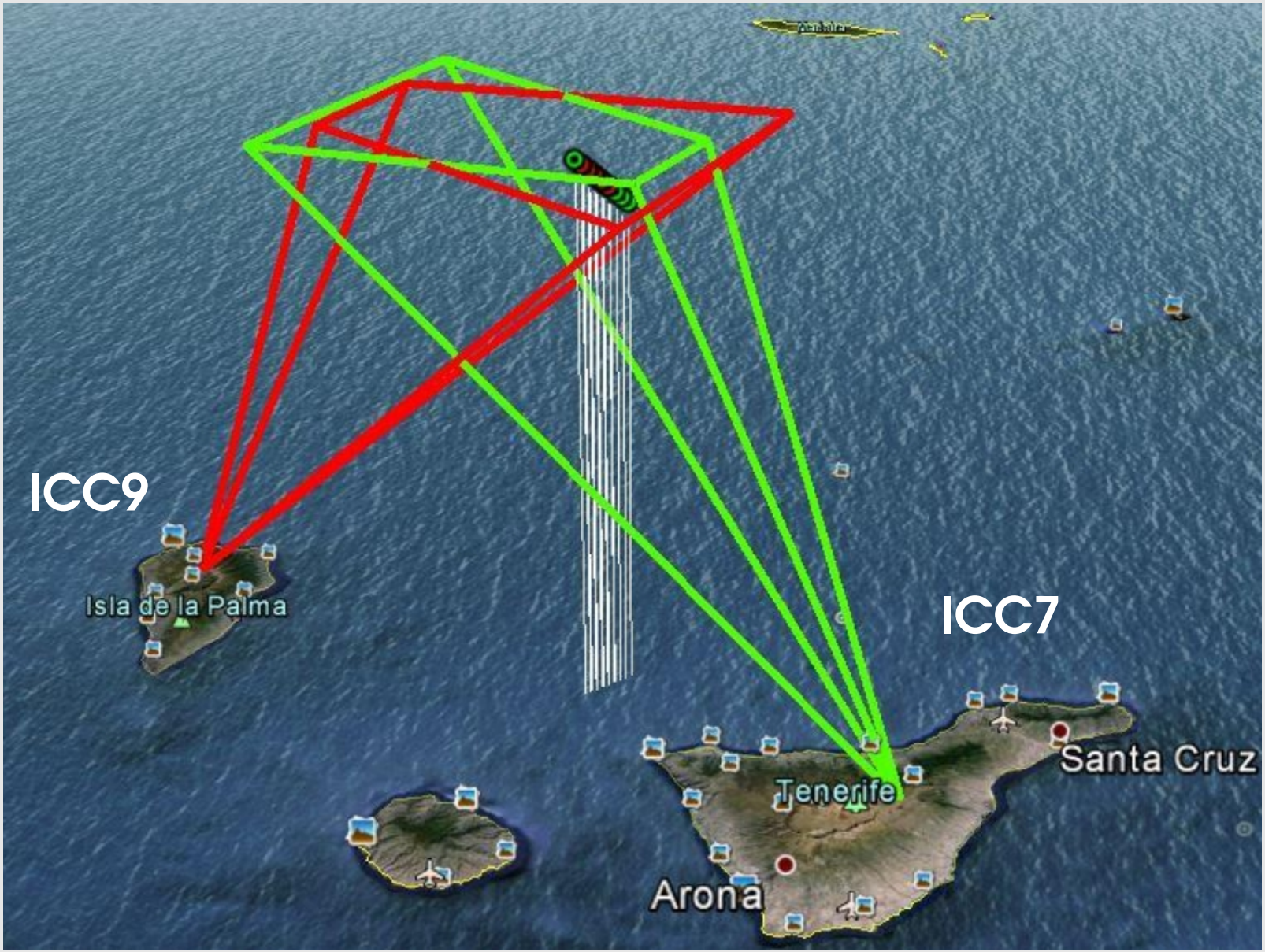
2 Point.-dep. bias



2 Point.-dep. bias



2 Point.-dep. bias



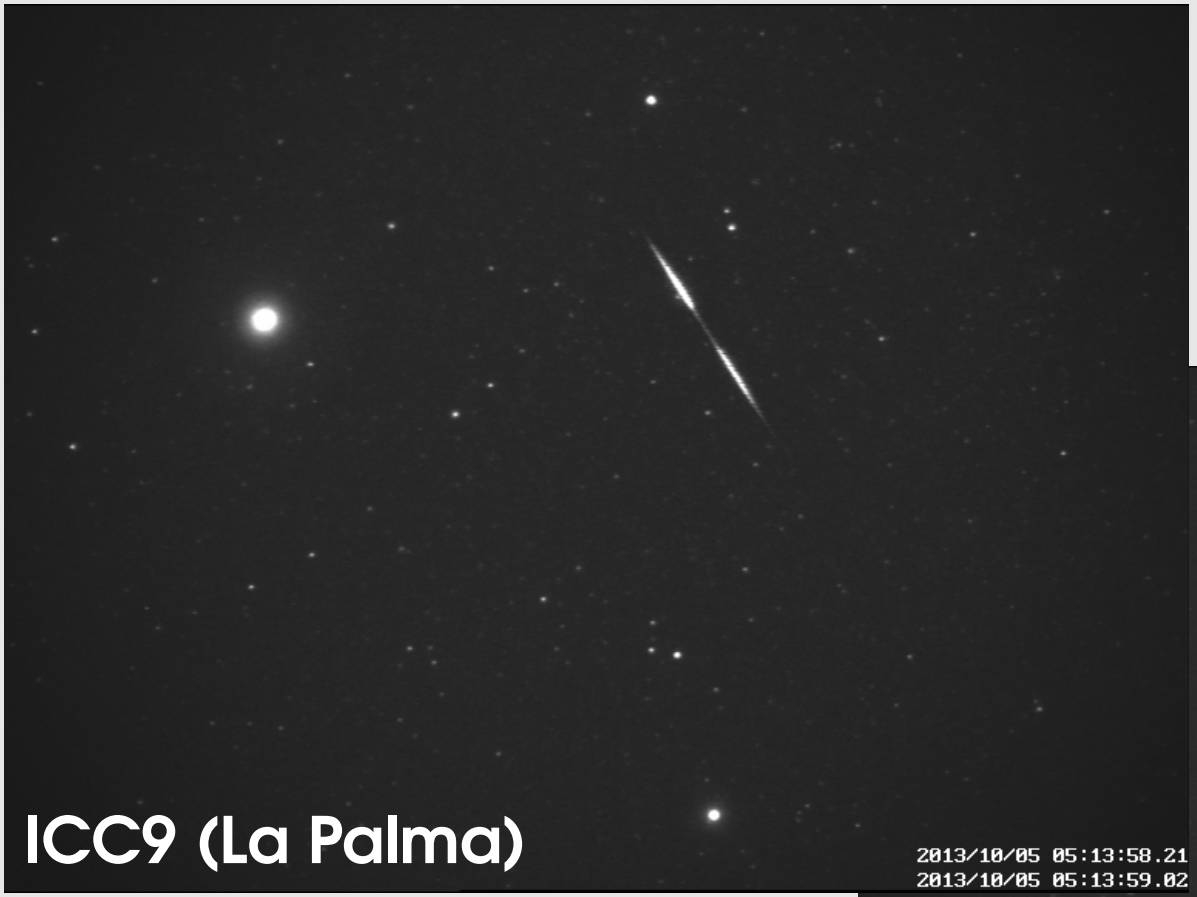
2 Point.-dep. bias

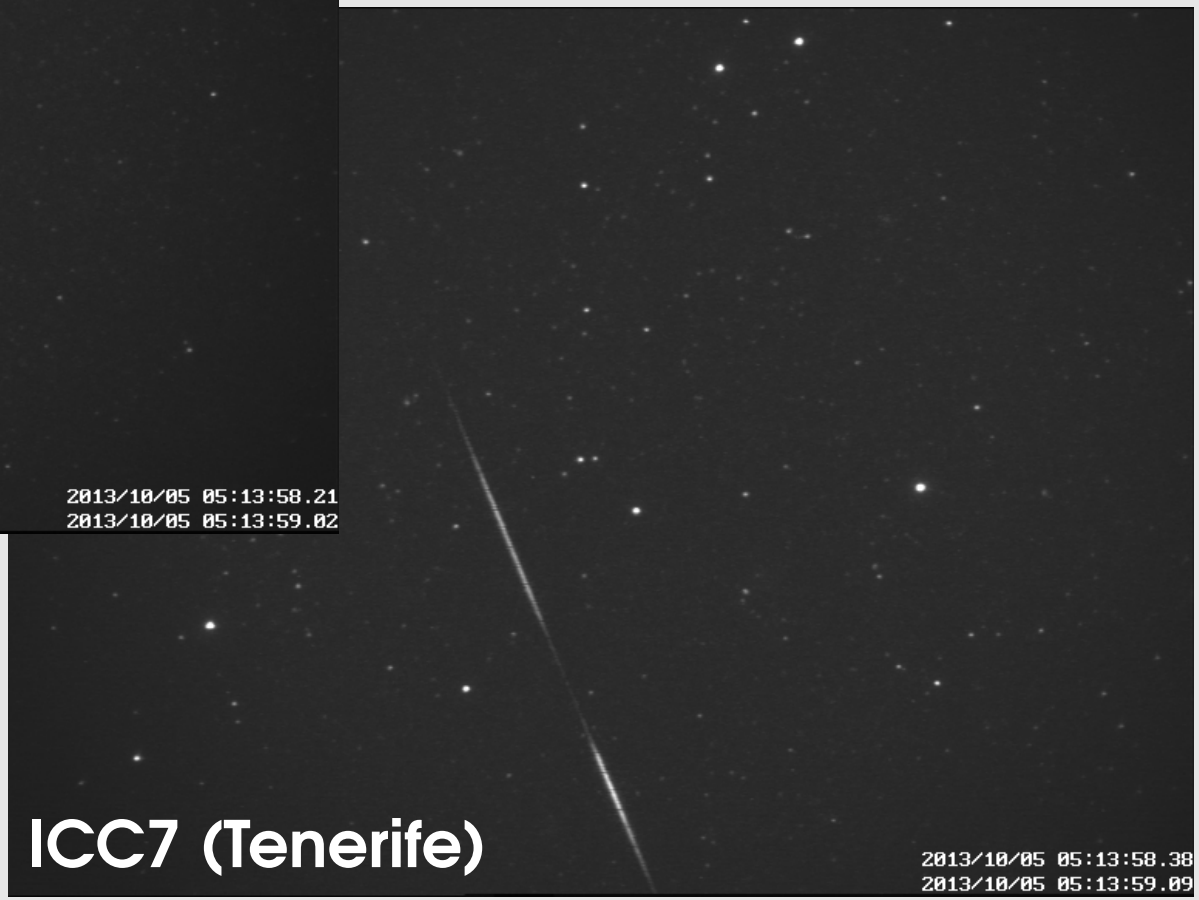
- Same meteor
- Appears slower on ICC9:

→ Longer Pixel dwell time

→ Better detectability

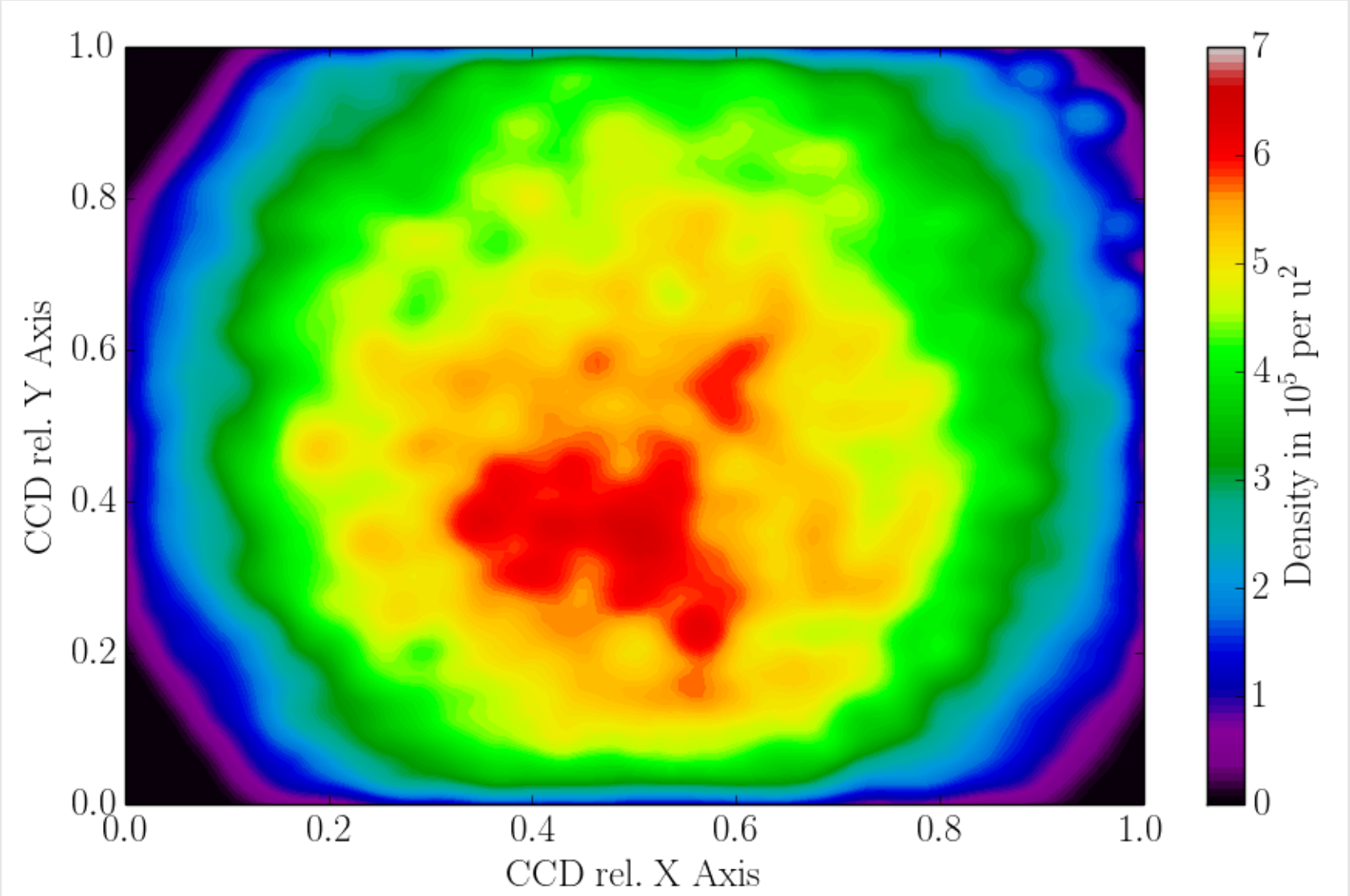
→ More frames





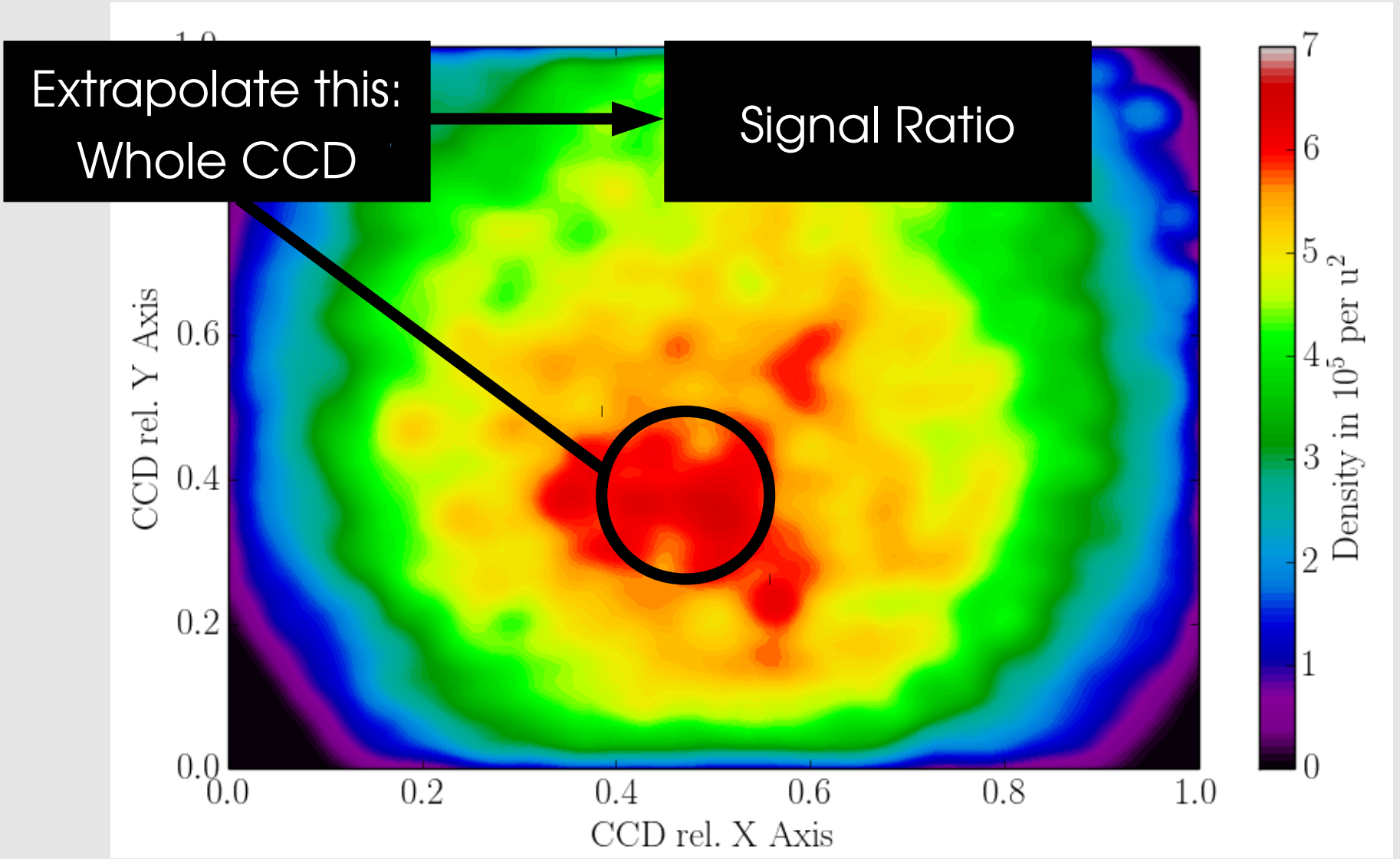
/1/ ESA MRG Webpage

3 Sensitivity



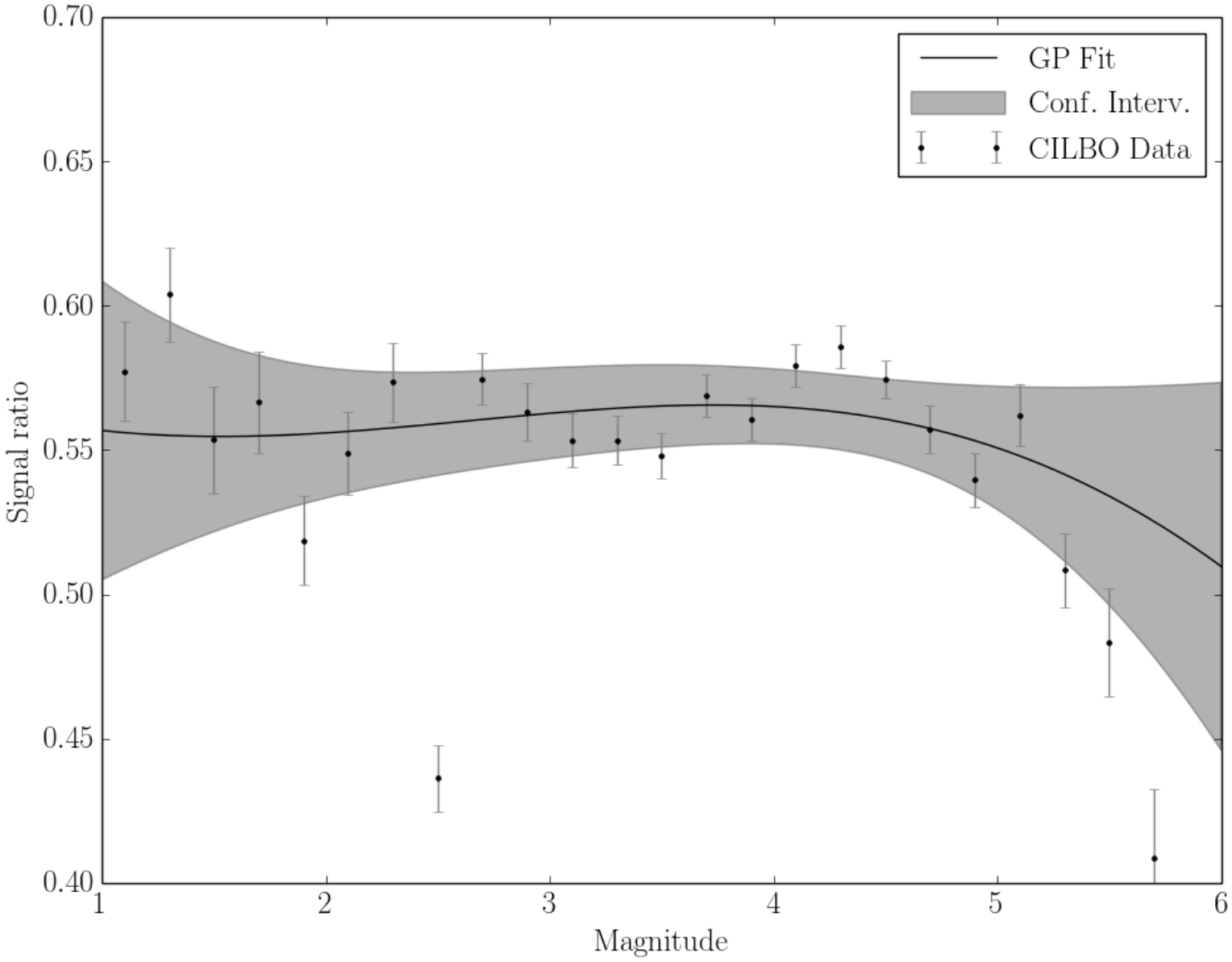
ICC9 (La Palma)

3 Sensitivity



ICC9 (La Palma)

3 Sensitivity



ICC9
(Ten.)

4.1 Summary

- Detection bias due to different camera boresights
  - Main reason: Apex meteors
  - ICC9: Meteors appear slower → Pixel dwell time longer → higher SNR
- Flat-field analysis based on meteor data:
  - Natural illumination falloff due to projection effects
  - Depend on meteor brightness

4.2 Outlook

- More data...
  - Improve sensitivity profile
- Time domain!

/1/ http://www.rssd.esa.int/index.php?project=METEOR&page=Index