Satellite Context for the Azores: Advection and Evolution

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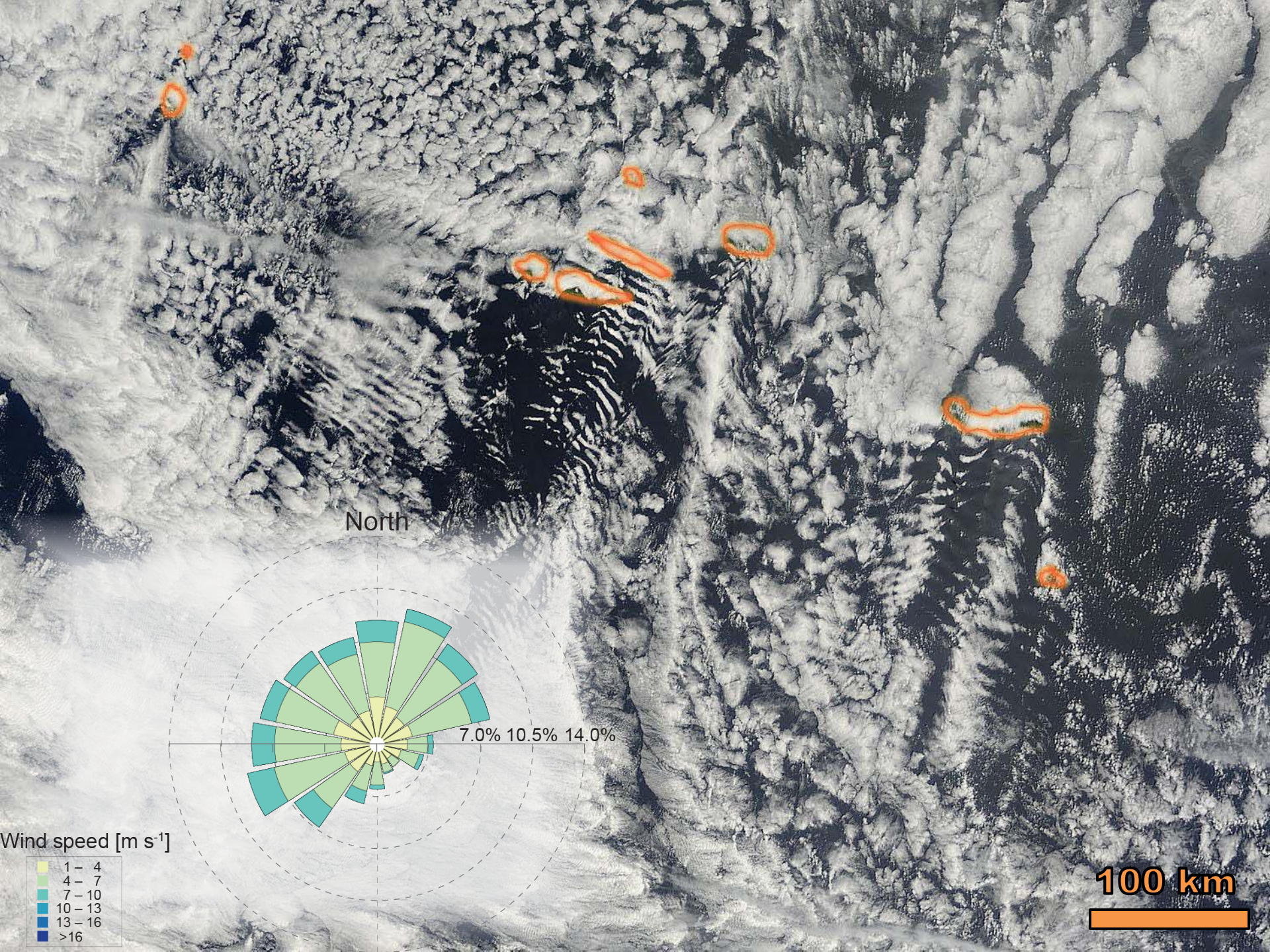
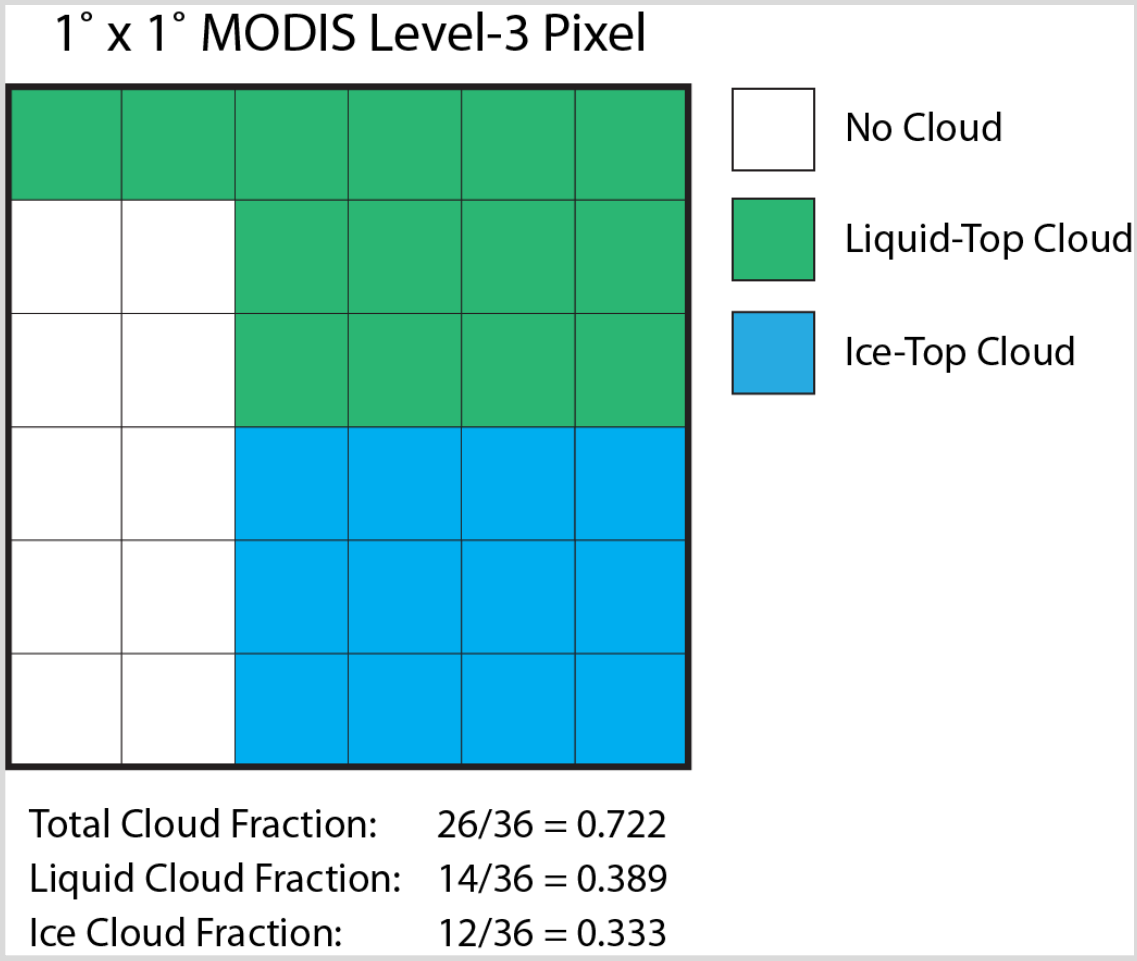
CP3g NC STATE UNIVERSITY
Clouds and Precipitation Processes and Patterns Group

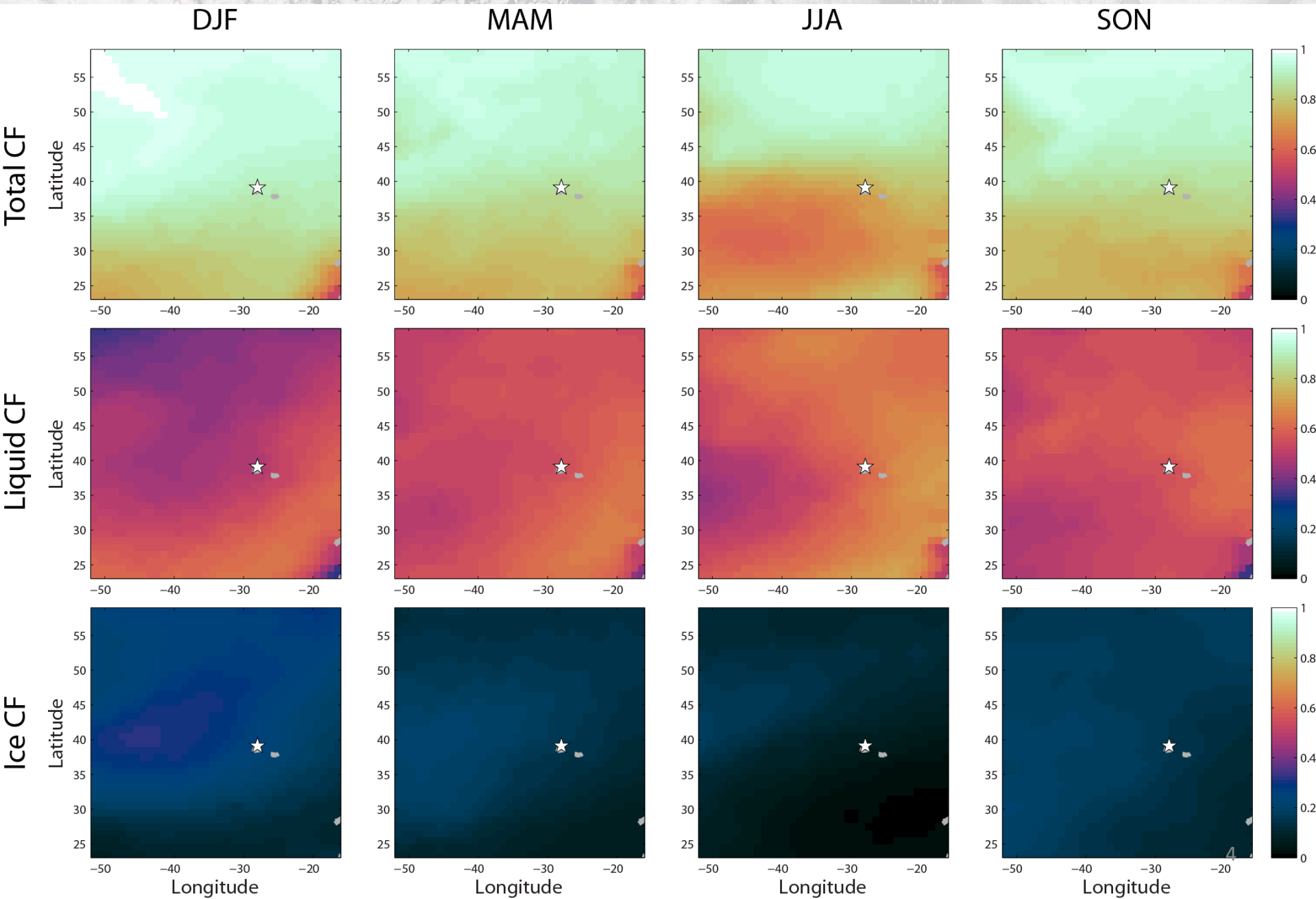

North
7.0% 10.5% 14.0%
Wind speed [m s-1]
1 – 4
4 – 7
7 – 10
10 – 13
13 – 16
>16
100 km

Cloud Fraction from Aqua MODIS Level-3

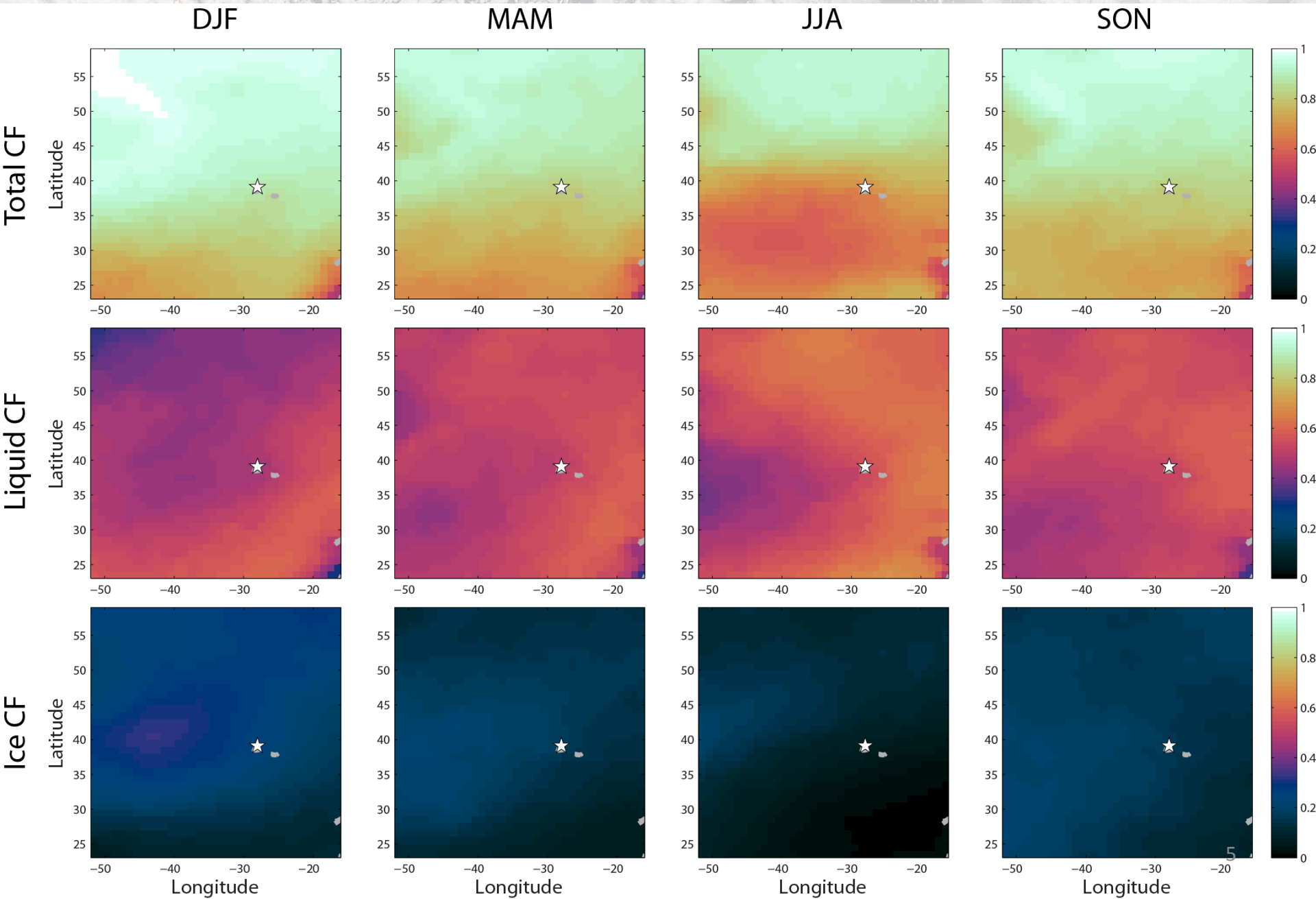
- Total Cloud Fraction
- Cloud Fraction by Phase
  - Liquid
  - Ice
  - Mixed
  - Unknown
- Phase determined at cloud top
- Only “sees” top cloud layer in multi-layer cloud scenario



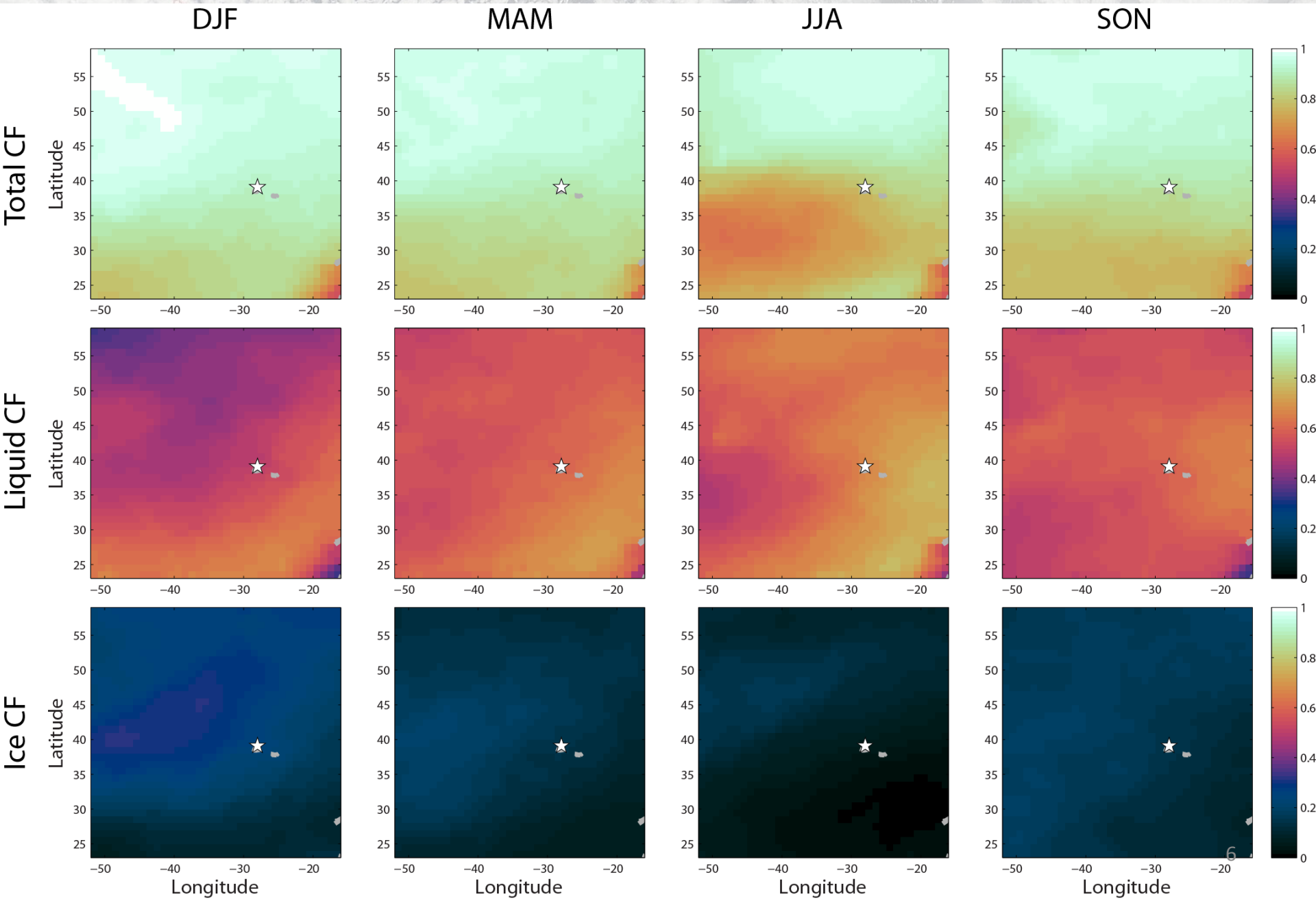
Aqua MODIS Mean Cloud Fraction — 2002-2012 — Day+Night



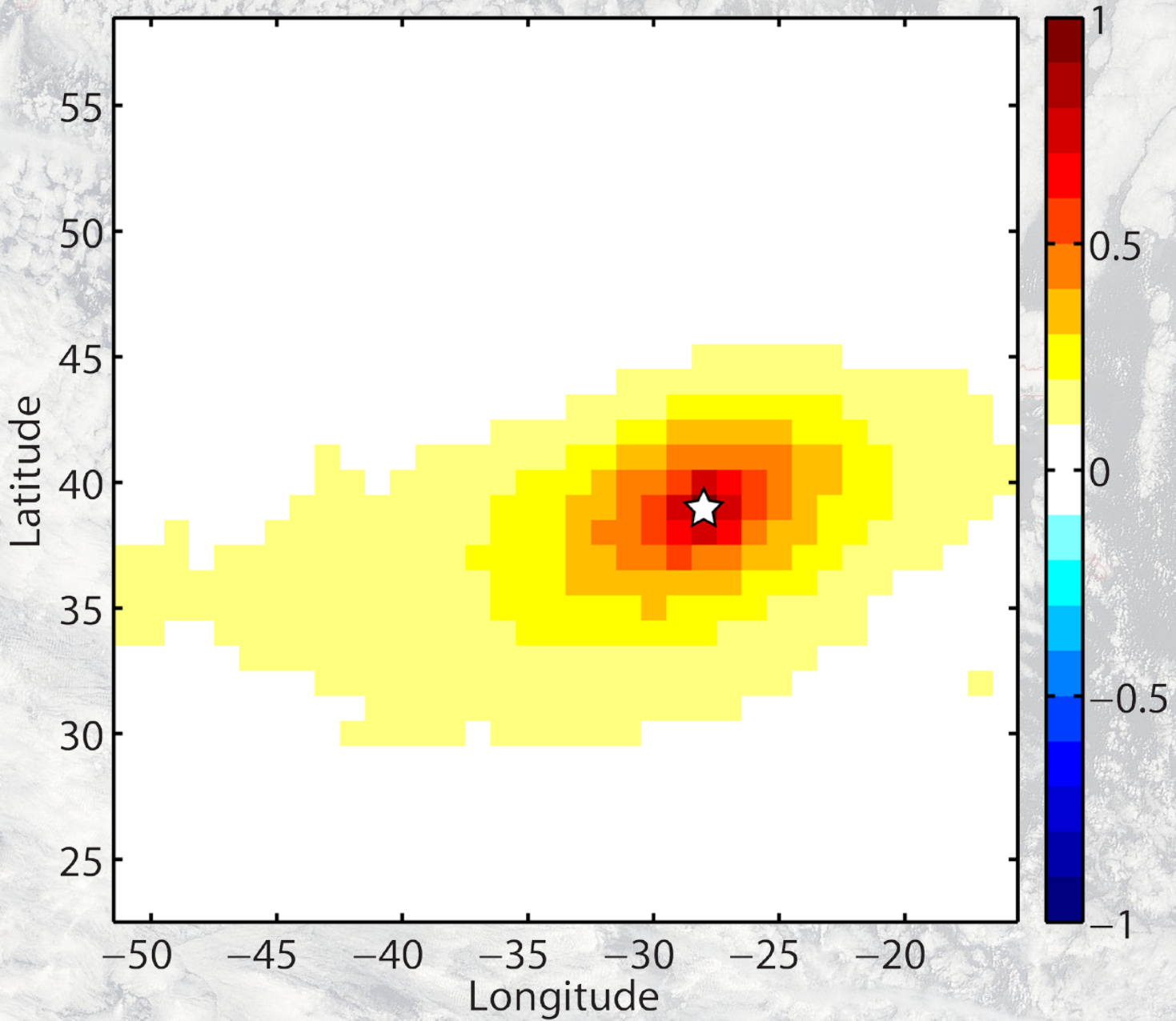
Aqua MODIS Mean Cloud Fraction — 2002-2012 — Day Only



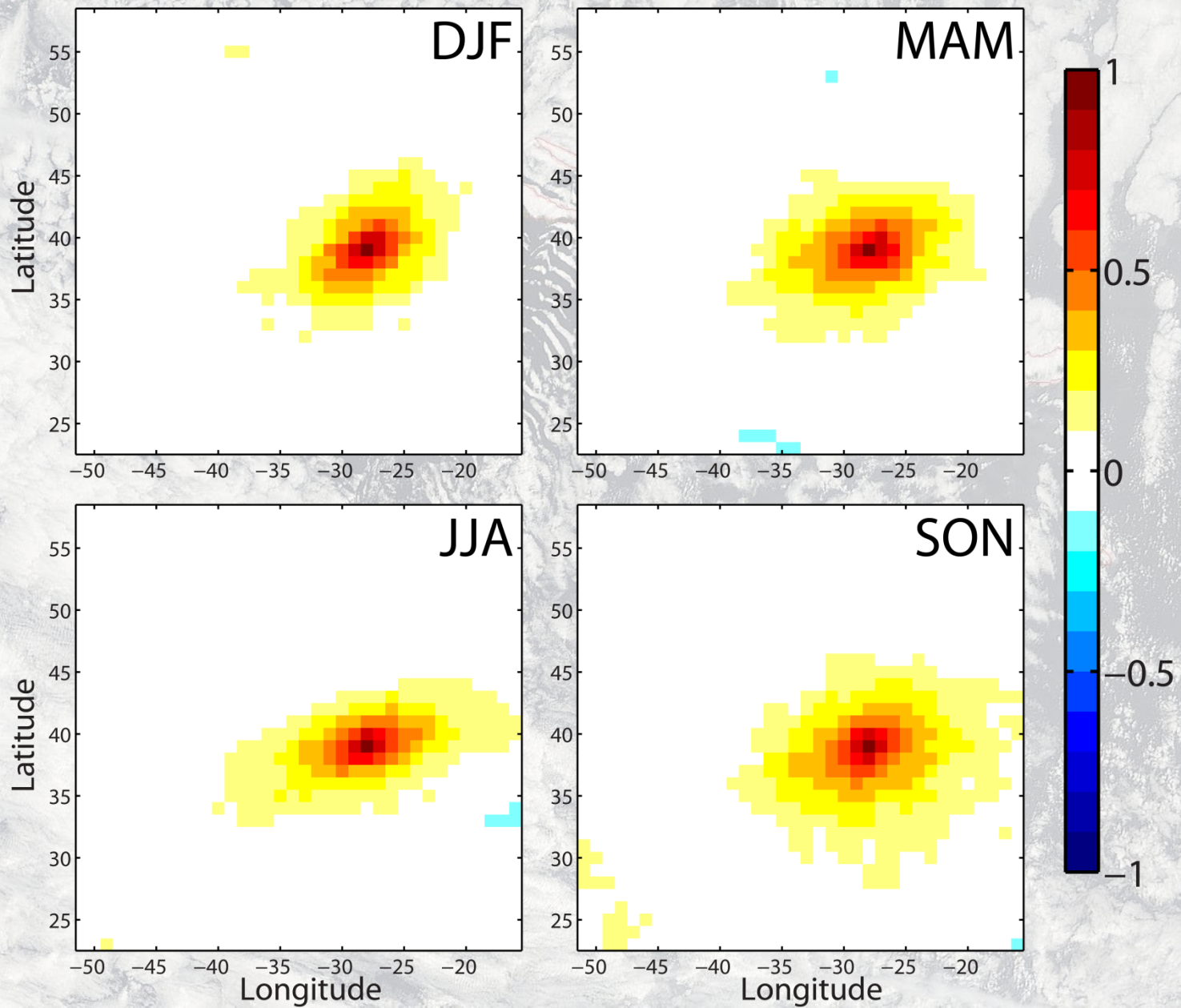
Aqua MODIS Mean Cloud Fraction — 2002-2012 — Night Only



Graciosa Total Cloud Fraction Correlation Map
MODIS Terra+Aqua Day+Night 2000–2012



Graciosa Total Cloud Fraction Correlation Map
MODIS Aqua Day 2002–2012



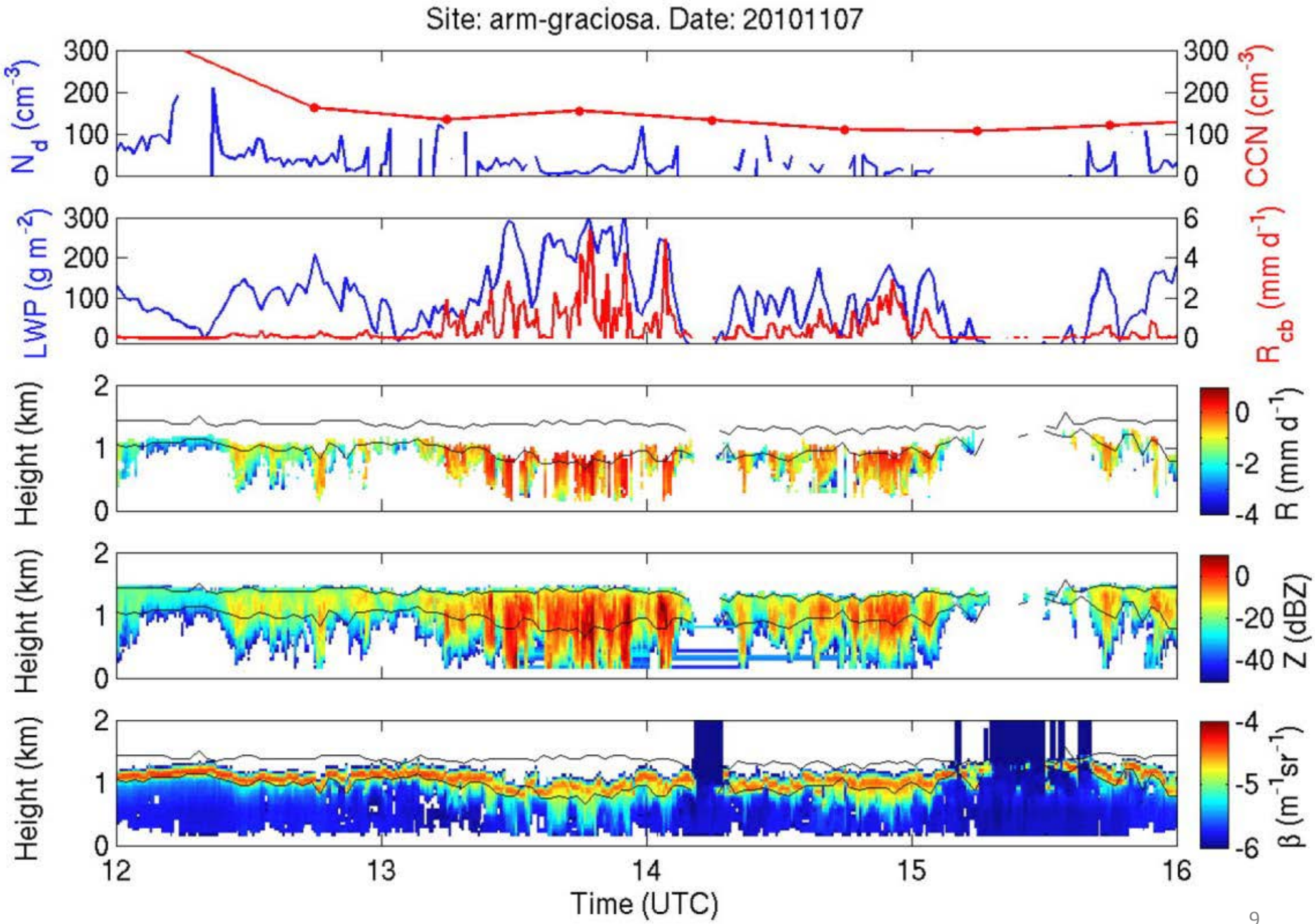
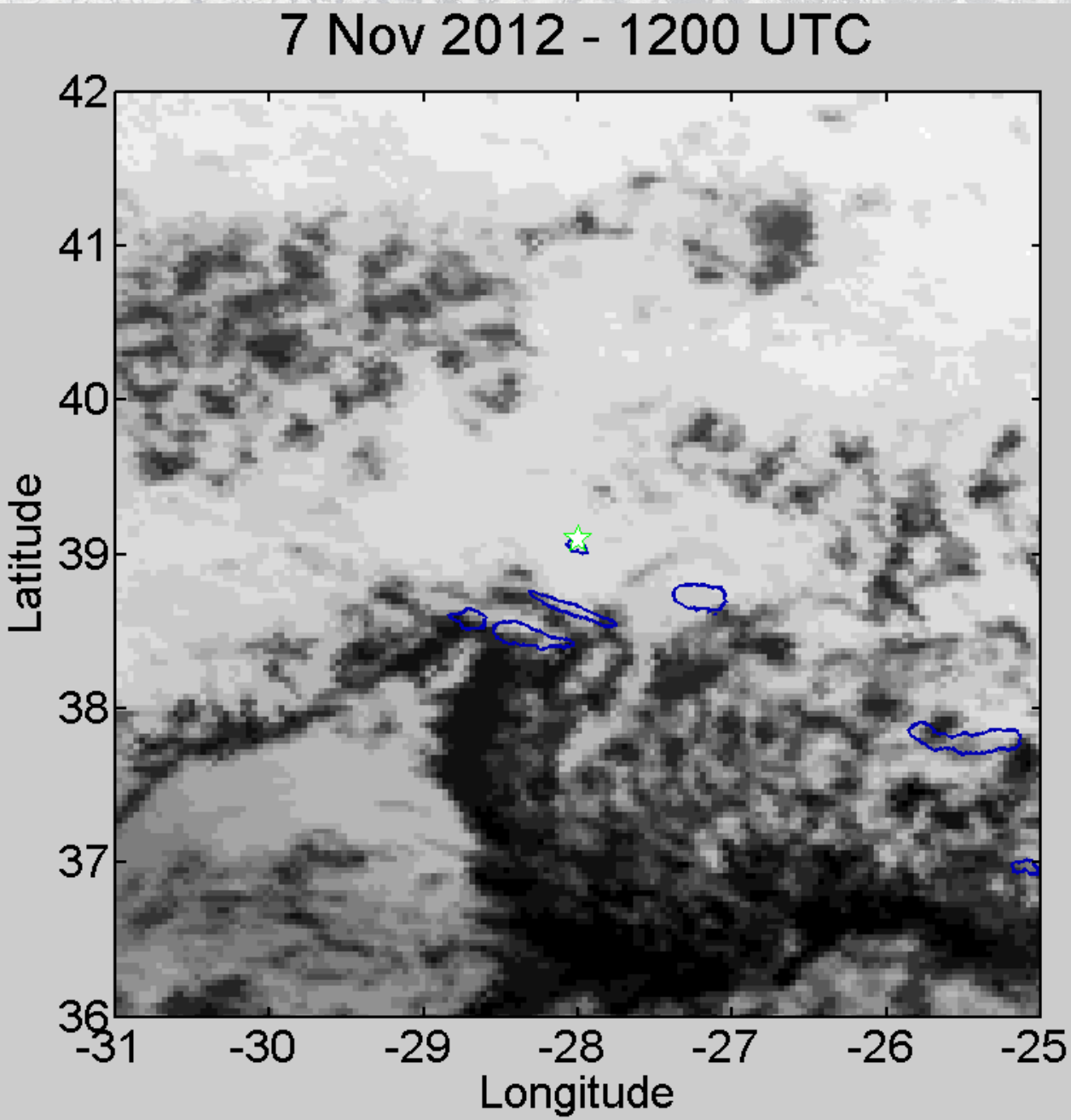


Figure From Wood et al., BAMS, submitted


7 Nov 2012 - 1200 UTC
42
41
40
39
38
37
36
Latitude
-31
-30
-29
-28
-27
-26
-25
Longitude

Conclusions

- The Azores lie in a region of spatial gradients in cloud frequency and meteorological conditions
  - Details vary seasonally
- Cloud observations are reasonably representative within a 1° radius of Graciosa
  - Beyond 1°, correlation ≤ 0.5 (≤ 25% of variance)
- Broad cloudiness context needed for reliable interpretation of ARM Graciosa observations
- Value-Added product proposed to provide information on regional cloudiness

Need input from ASR community on satellite context VAP

1. Regional IR map at 30 min temporal resolution (4 km × 4 km) based on NASA/CPC/NCEP/NWS Merged IR product
2. Distilled information about total cloud fraction over and near Graciosa to aid in identifying periods with cloudiness gradients and for differentiation between cloud advection and evolution

What will suit your needs?