The Abdus Salam
International Centre for Theoretical Physics

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Educational, Scientific and
Cultural Organization

IAEA
International Atomic Energy Agency

2148-Presentations

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RegCM4 simulation of dust storm in Arizona December 22nd 2009

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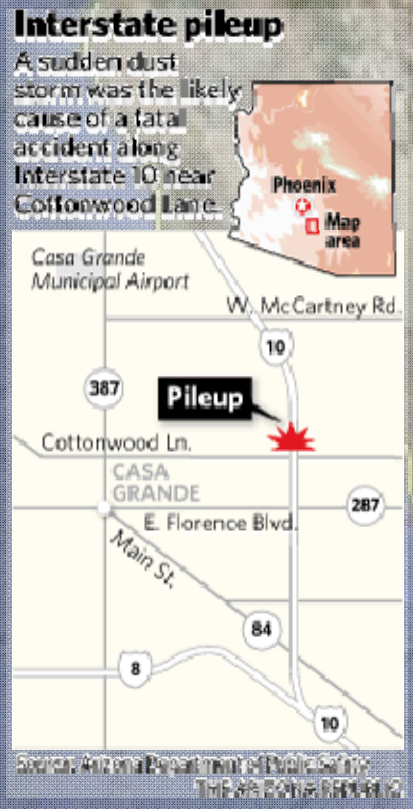
RegCM4 simulation of dust storm in Arizona December 22nd 2009

INTERSTATE - 10



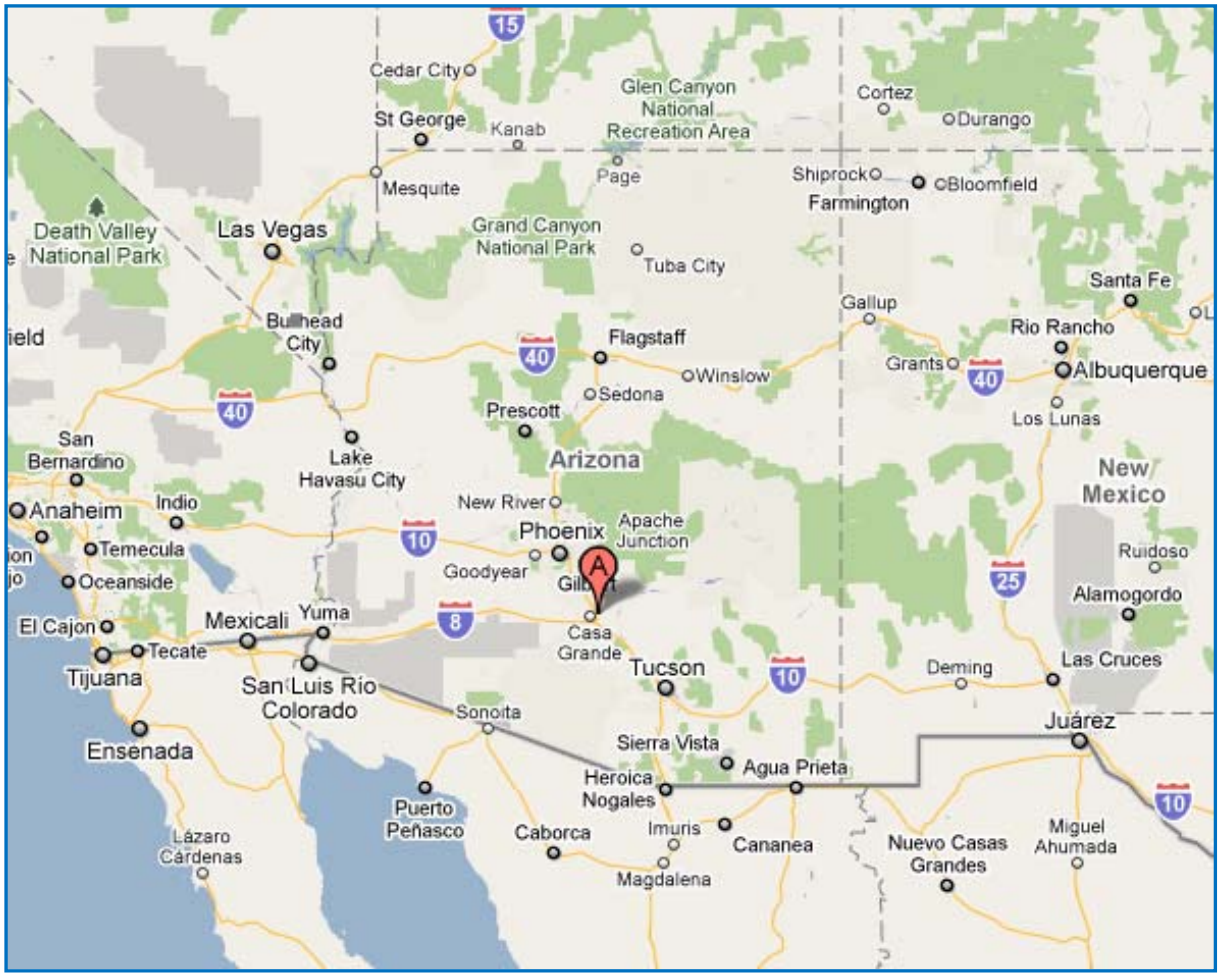
Mirjam Vujadinovic
Ana Vukovic
University of Belgrade
Serbia

Model setup:

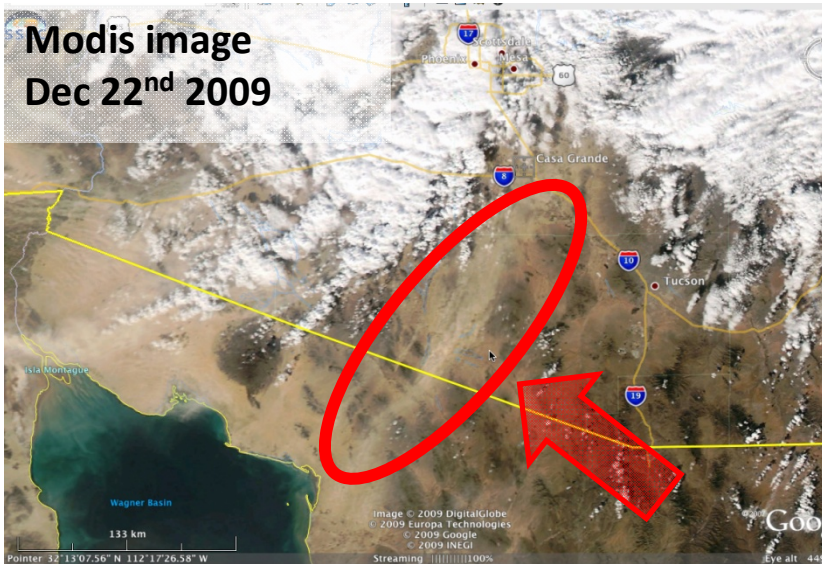
- resolution: 10km
- model run: 72 hours; 21st 00 UTC - 24th 00 UTC December 2009
- icbc: ECMWF analysis; resolution 0.5 degrees
- output on 1h
- model domain:
  Arizona

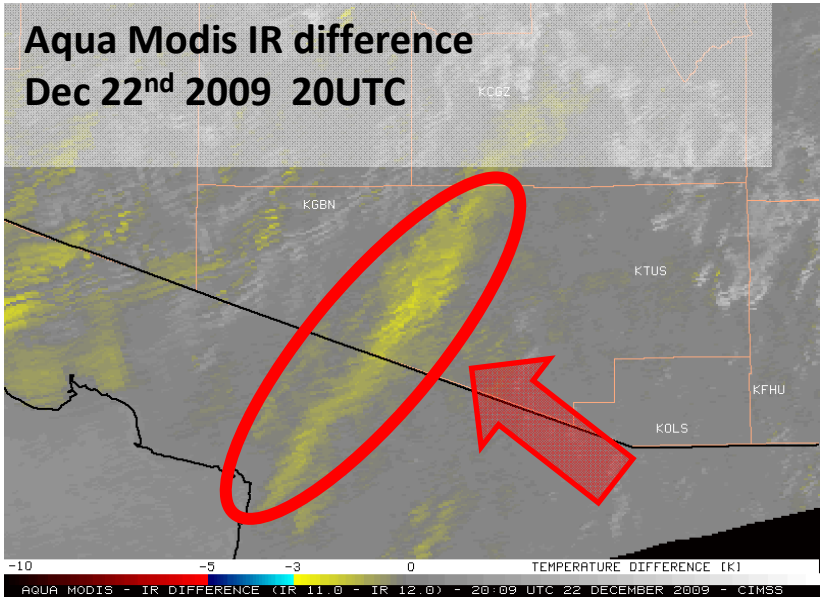
Verification:

- pm10 measurements
- satellite images

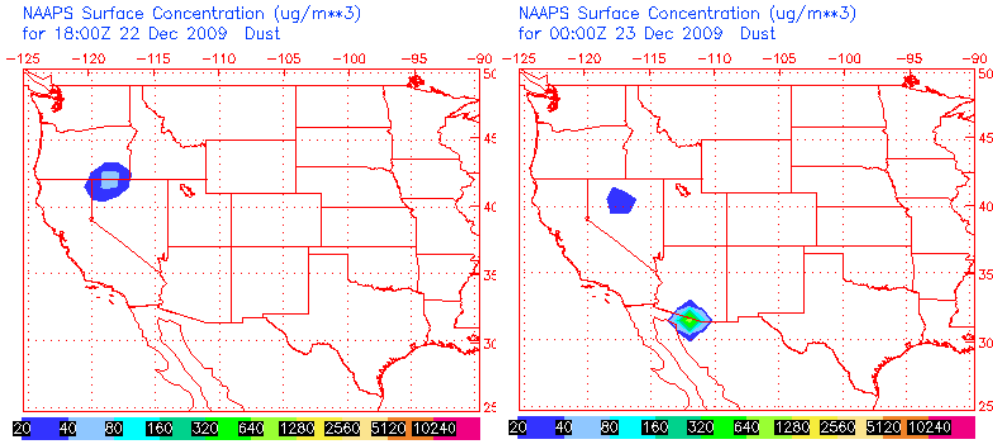


Satellite images and NAAPS:

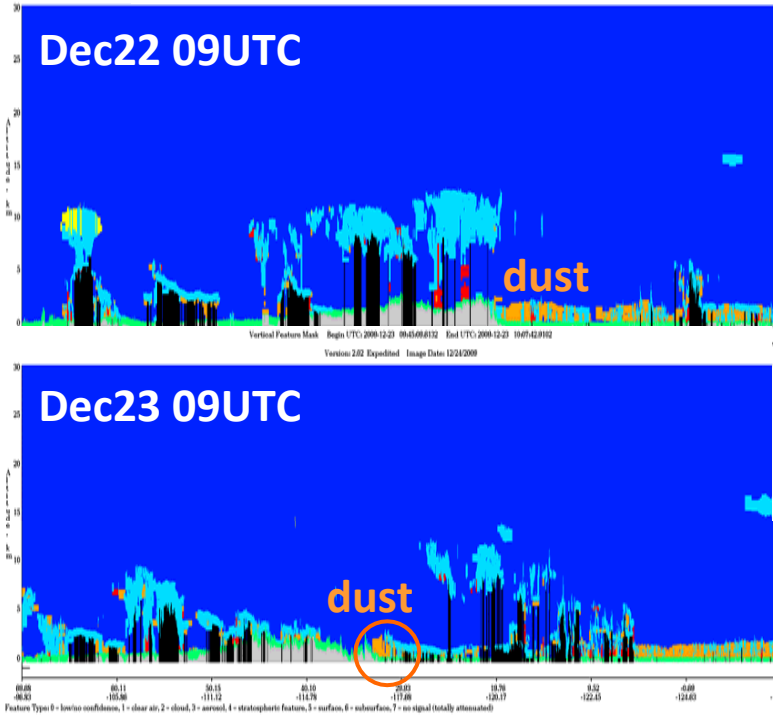




NAAPS Global Aerosol Model

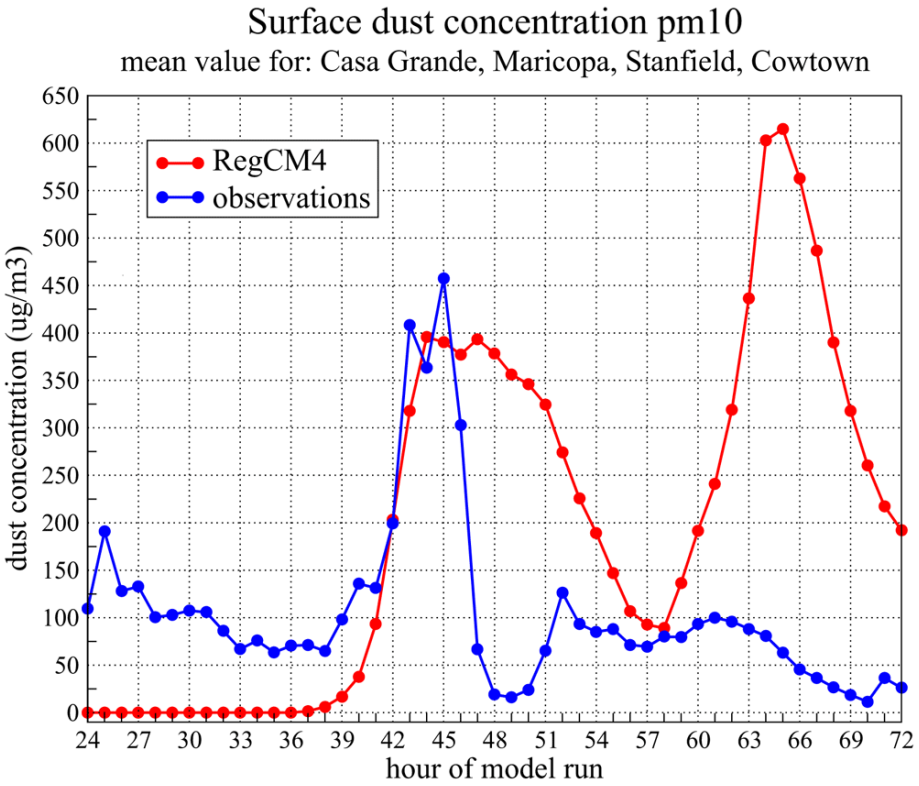


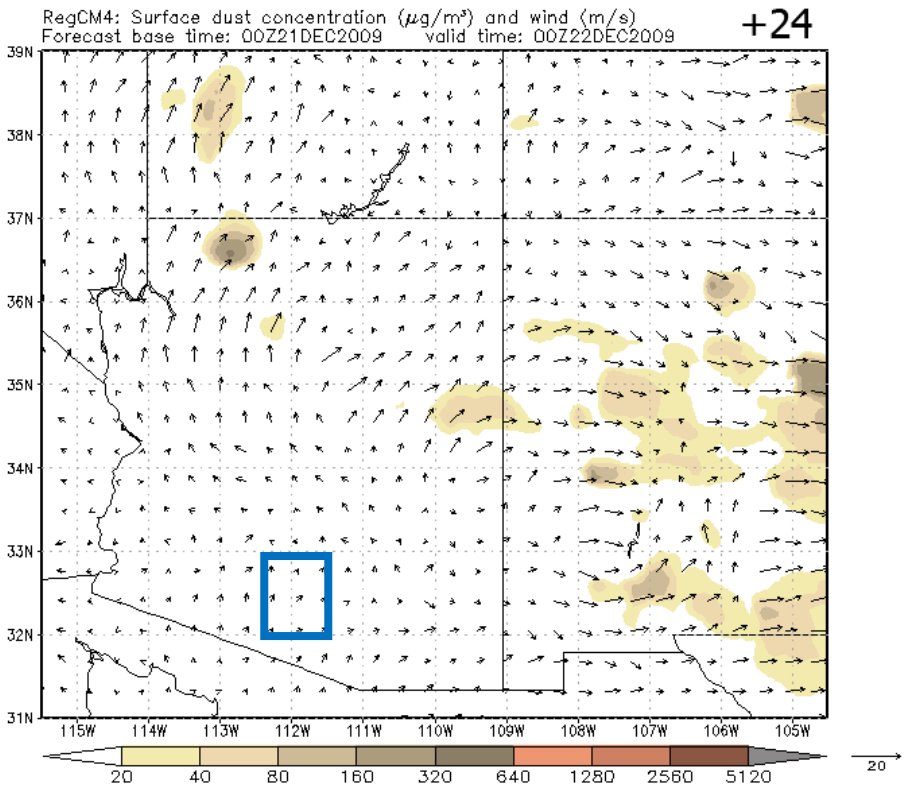
CALIPSO DATA NEAR ARIZONA



1. case: large domain

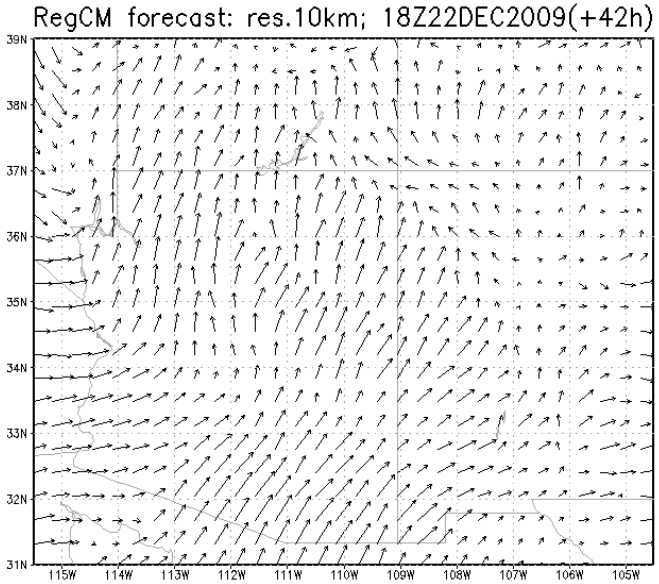
- 22 Dec 00 UTC (+24h) – 24 Dec 00 UTC (+72h)

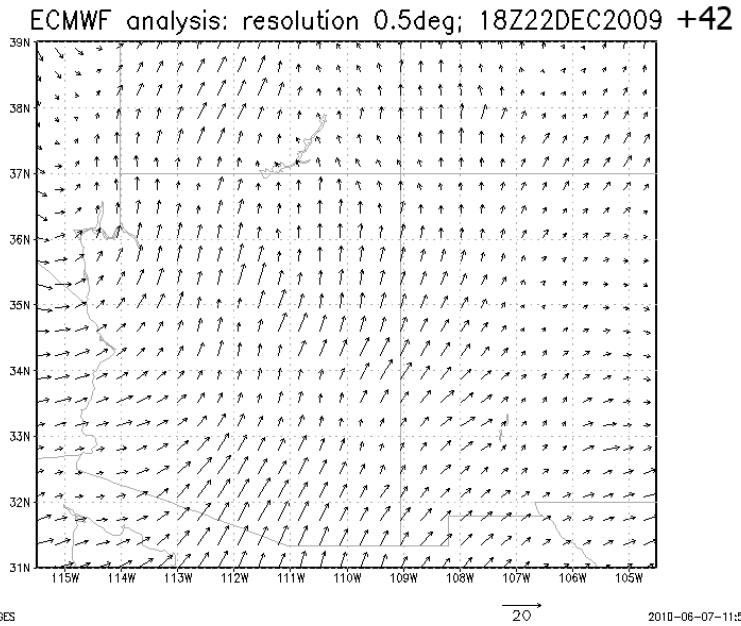




- first signal is well simulated, but second signal is fake !

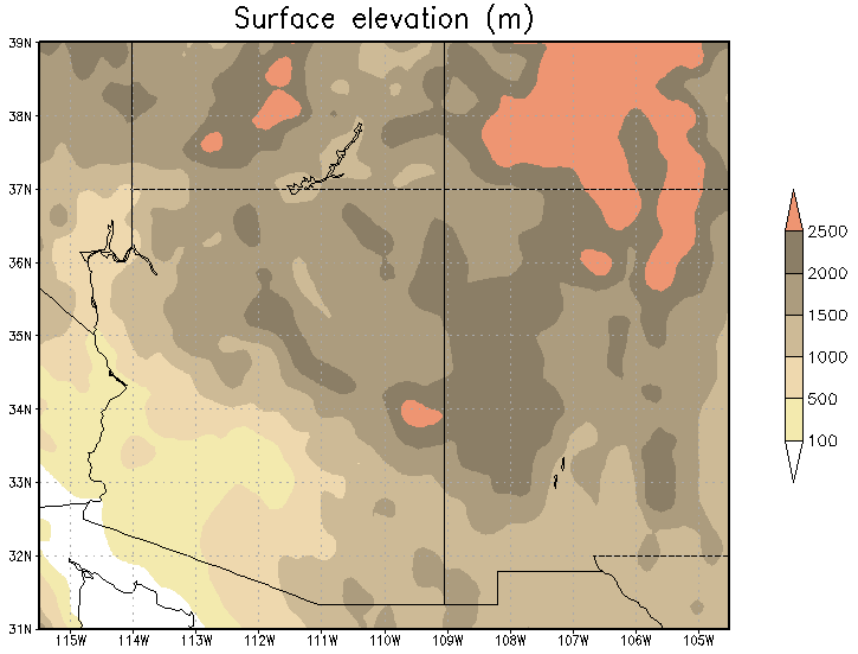
Explanation of the fake signal





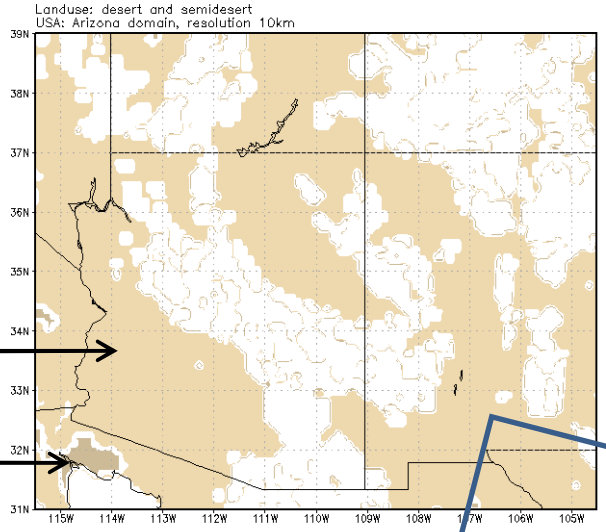
- velocity field: RegCM4 and ECMWF analysis at lowest model level: velocity is well forecasted with RegCM4 !

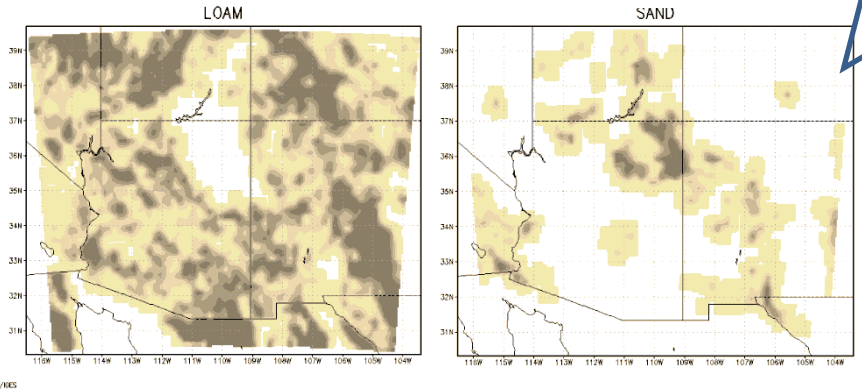
- elevation: south-west Arizona is at low altitudes an with no snow; at higher altitudes and in Dec. probably with snow; in model – no initialization of snow !

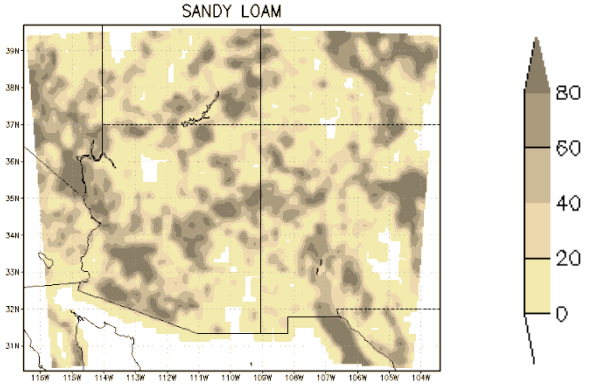


- landuse and texture: RegCM4 and MODIS

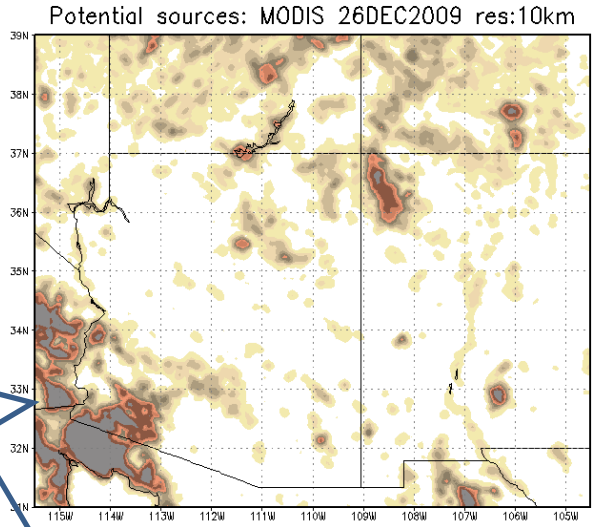
RegCM4 potential sources





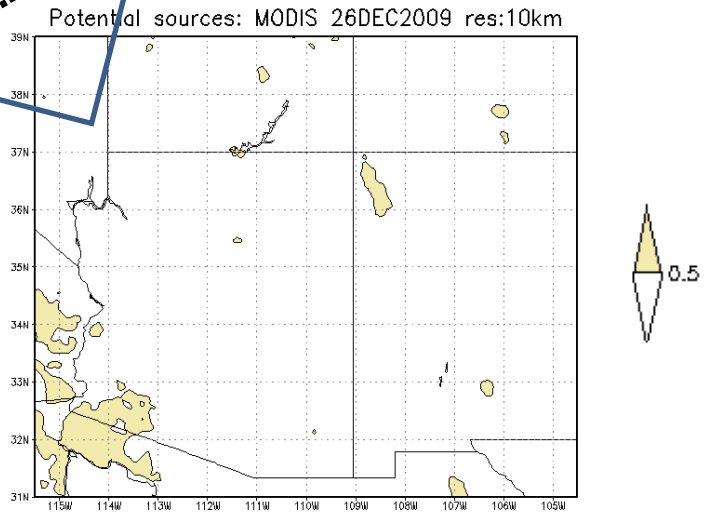


MODIS potential sources



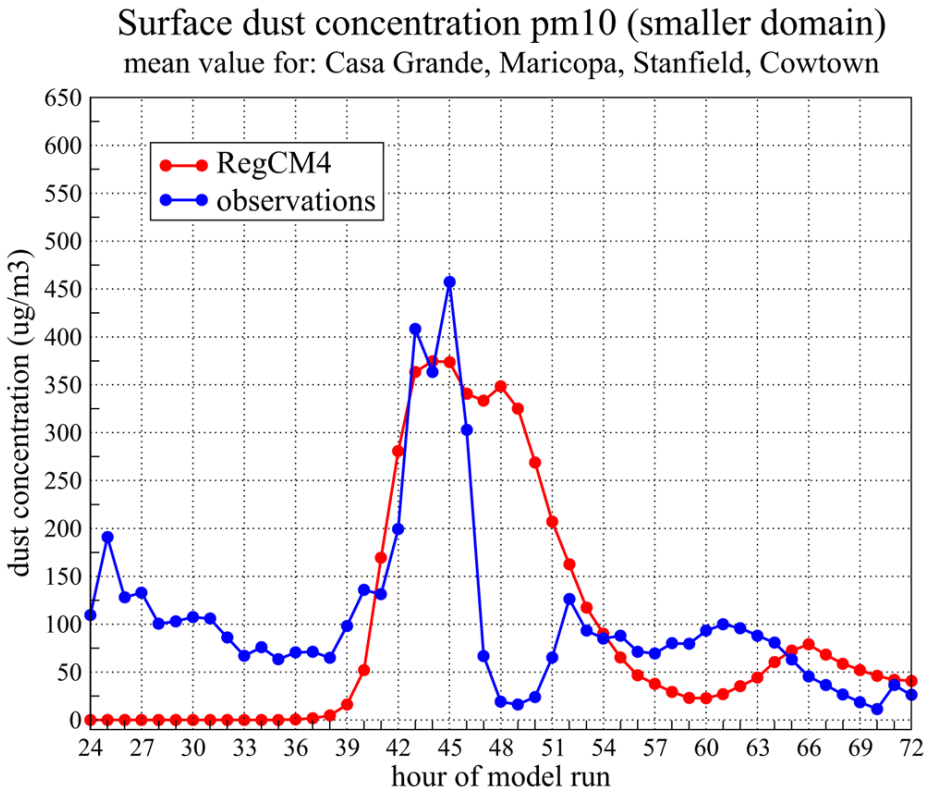
Compare !

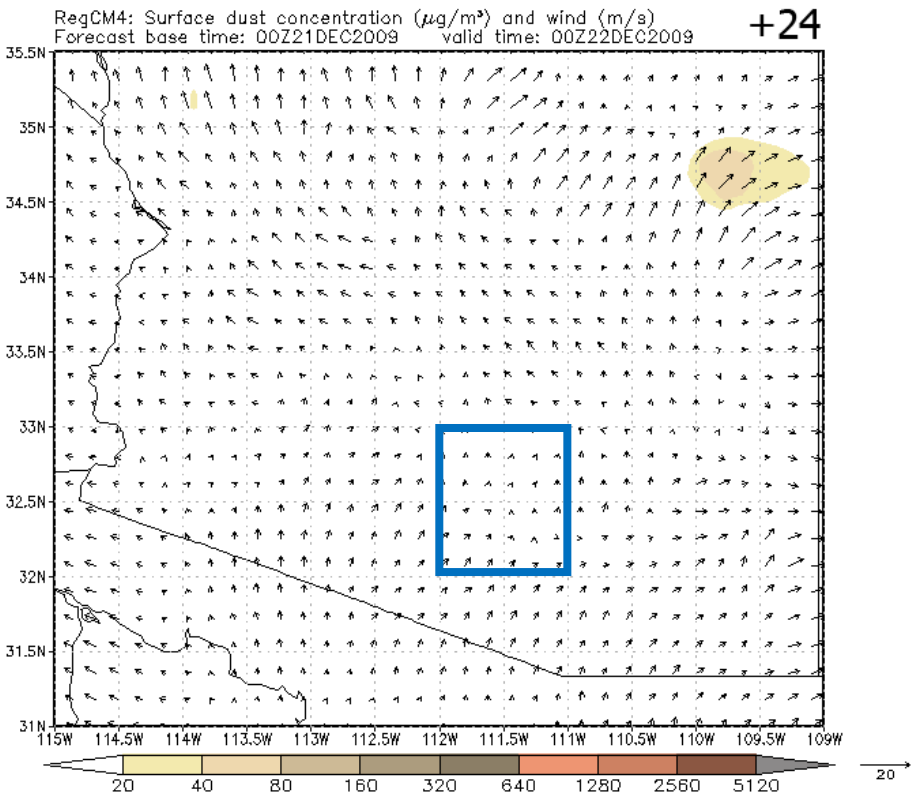
how model would see the MODIS mask:



2. case: small domain

- 22 Dec 00 UTC (+24h) – 24 Dec 00 UTC (+72h)

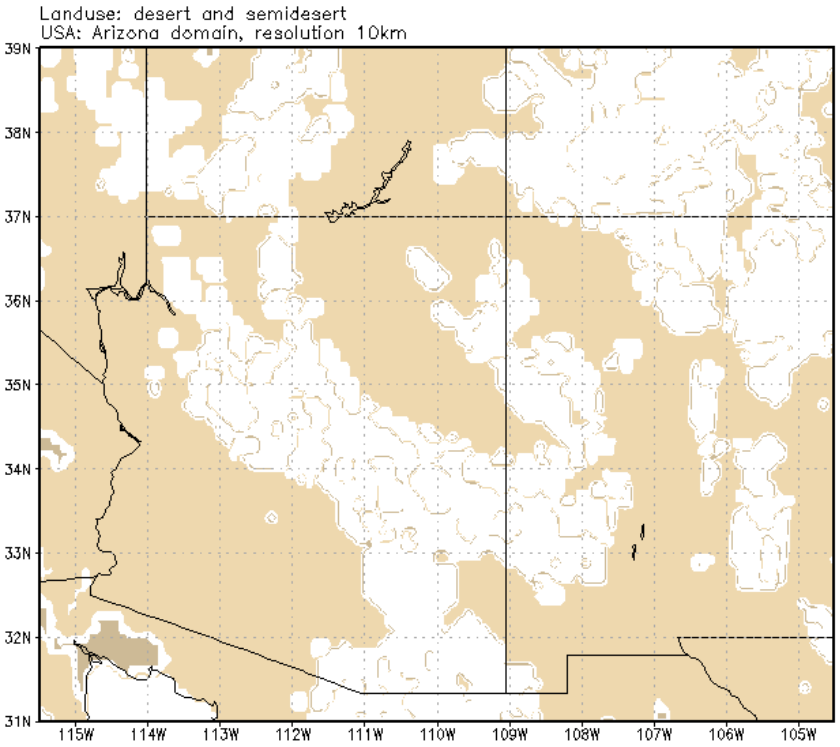




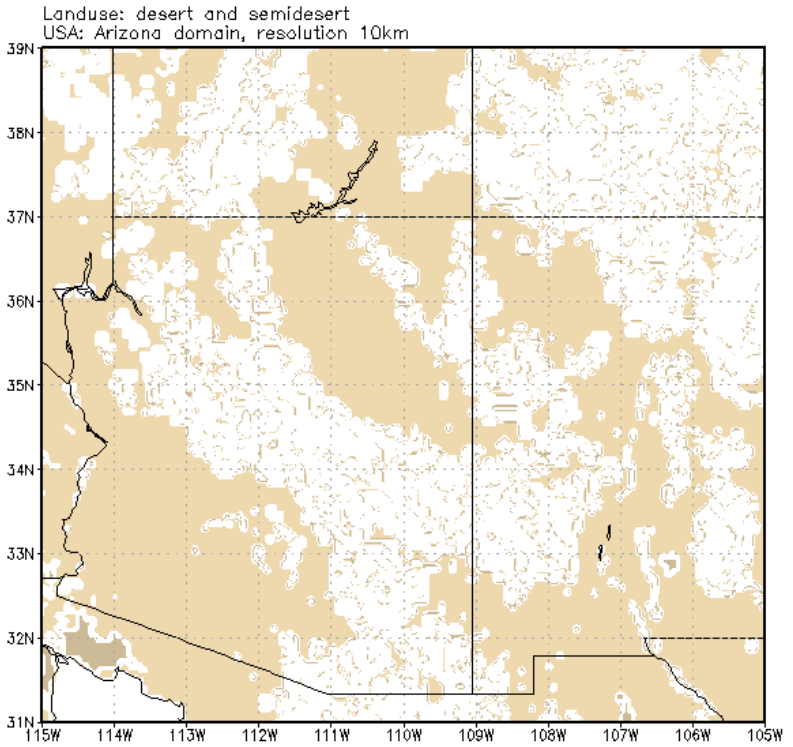
- first signal is well simulated, NO MORE FAKE SIGNAL !

3. case: large domain with 7km resolution

landuse – 10km resolution

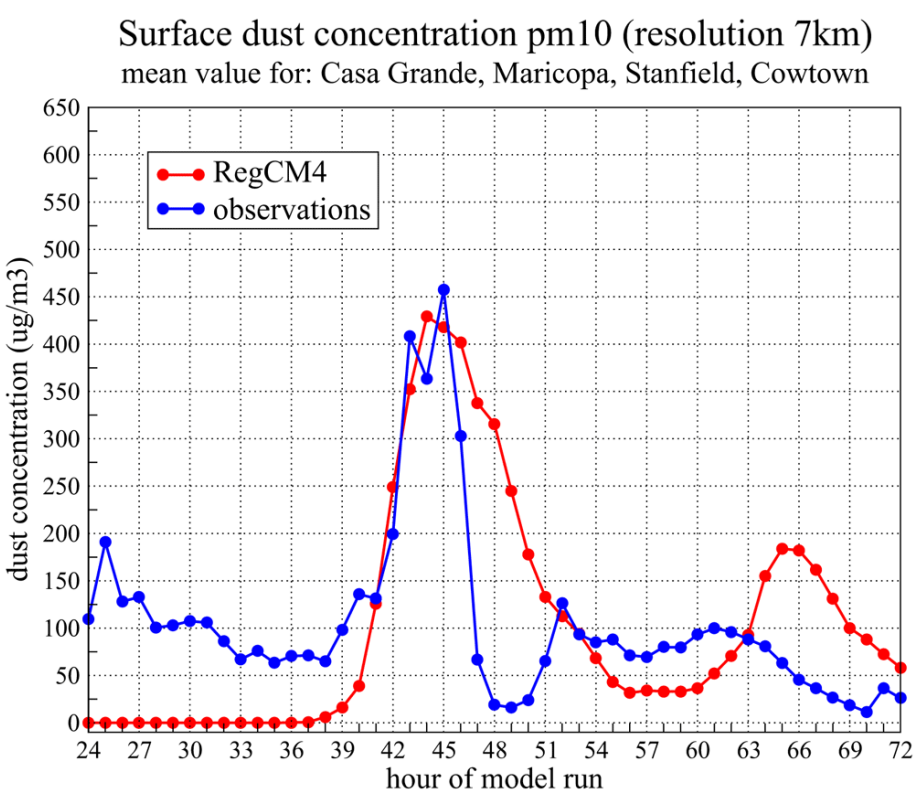


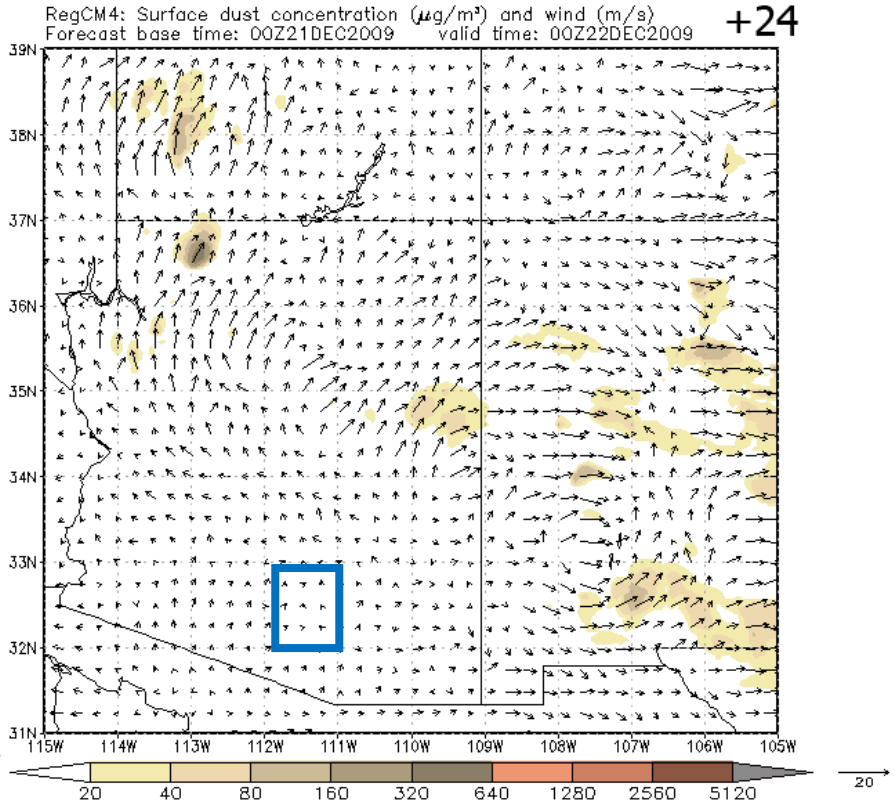
landuse – 7km resolution



Results for 7km resolution:

- 22 Dec 00 UTC (+24h) – 24 Dec 00 UTC (+72h)

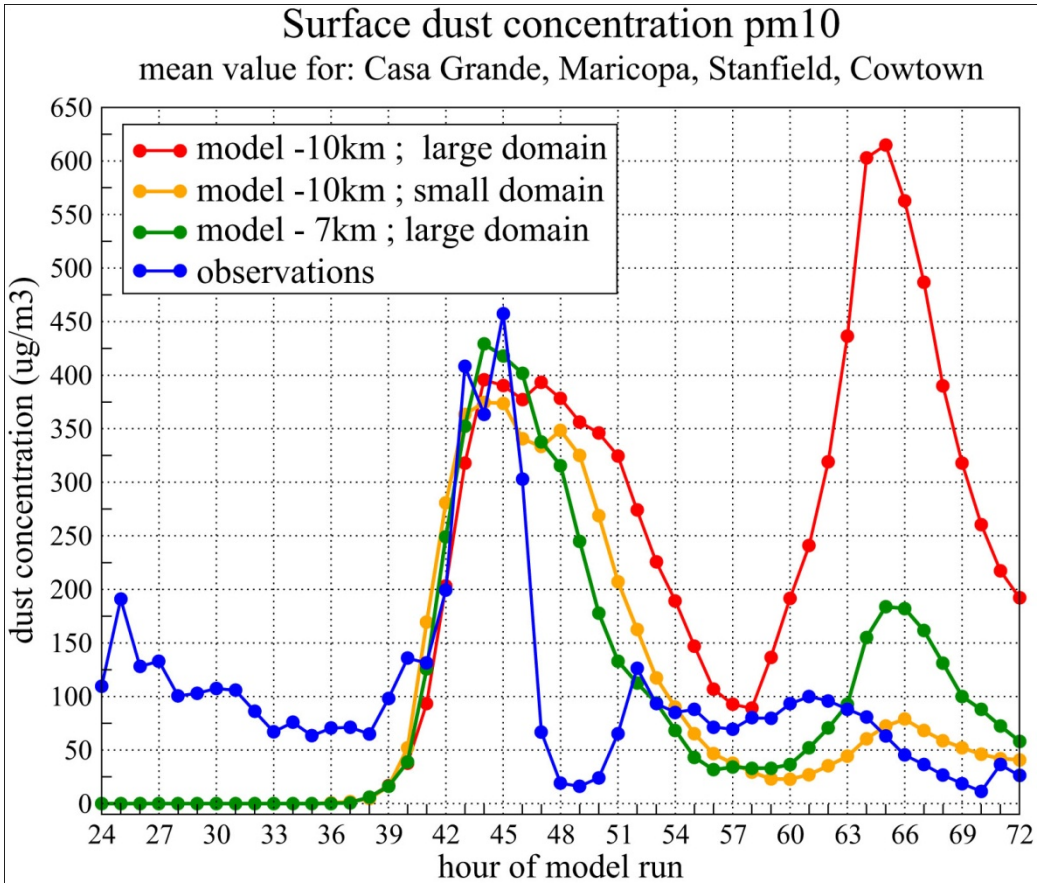




- first signal is better simulated (narrow signal), higher resolution reduced fake signal !

… at the end …

all in one



thanks to: Bi
Ashraf
Fabien
Baris
Deniz

for: PreProc EINT50
idea to run dust simulation
tips & tricks in dust scheme
ntypec ntypec_s

Special thanks to Filippo & crew for introducing us to RegCM comunity :)