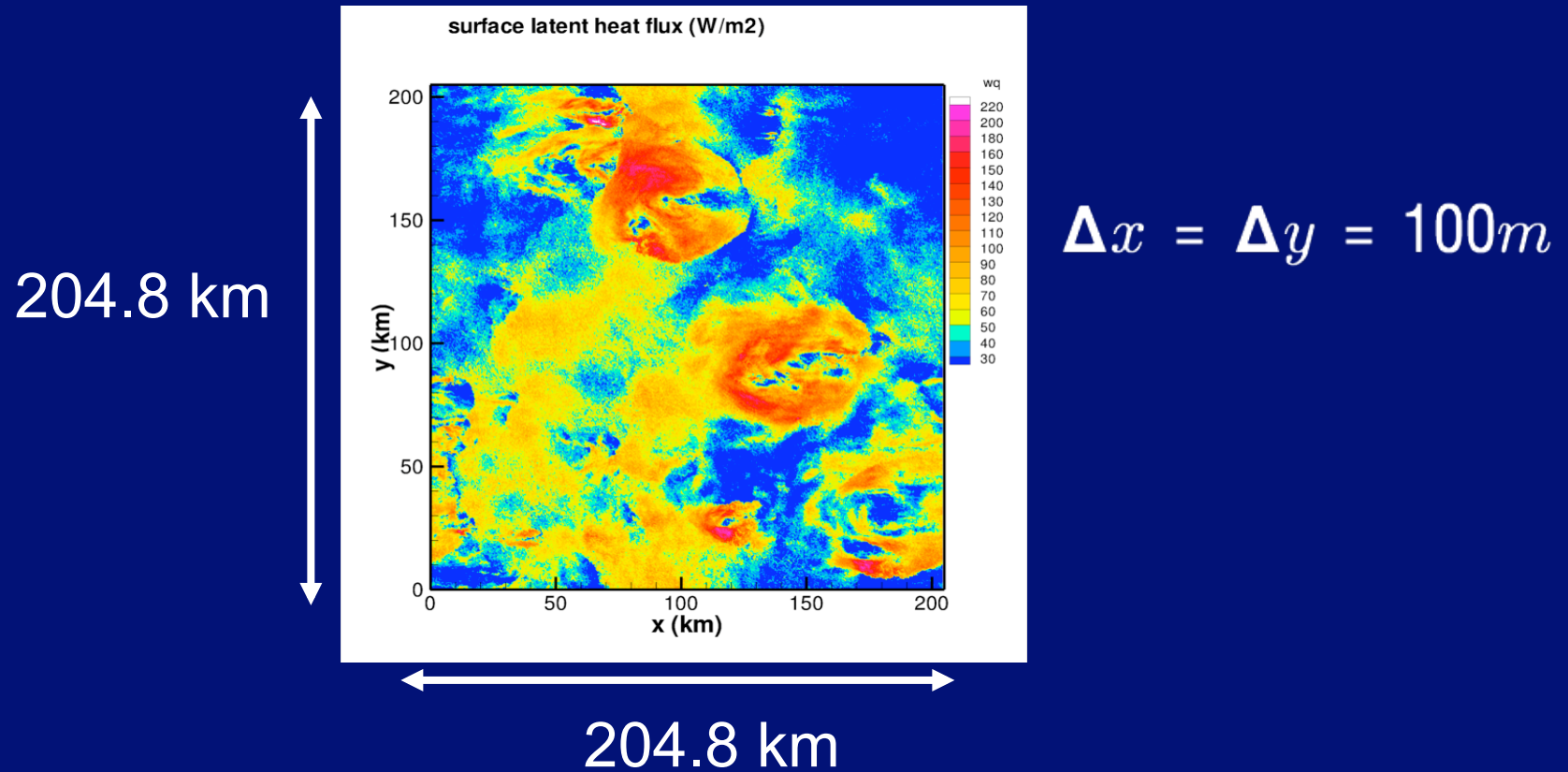


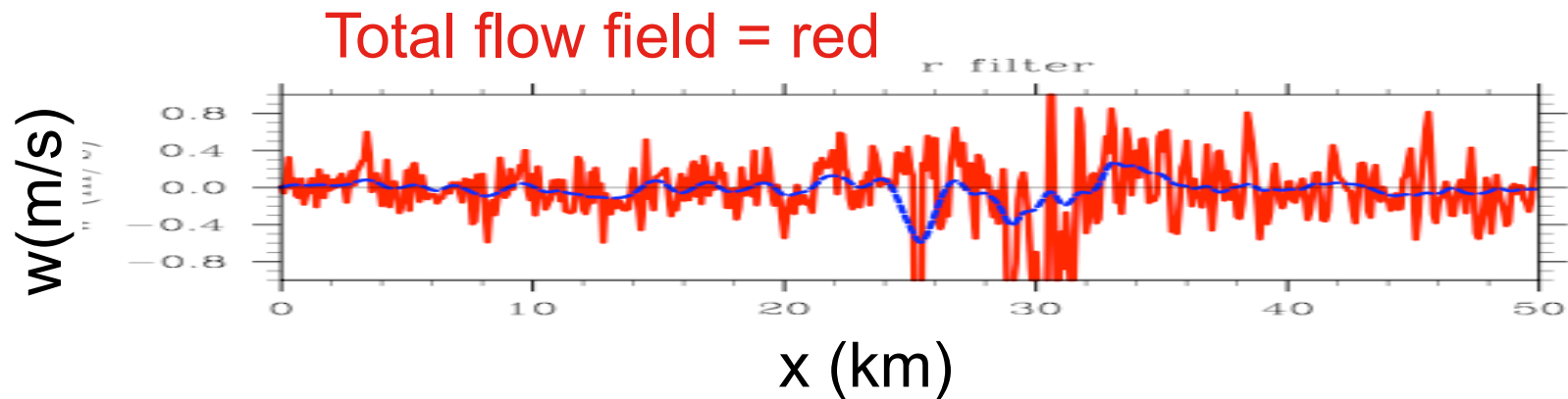
# Giga-LES: Evaluation of SGS schemes in CRMs



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Steve Krueger, Peter Bogenschutz, Dave Randall

# Split the LES flow into Filter-Scale (FS) and Sub-Filter-Scale (SFS)

Example: 1D filter



FS field = blue  $\Rightarrow$  “Resolved Scale” in CRMs

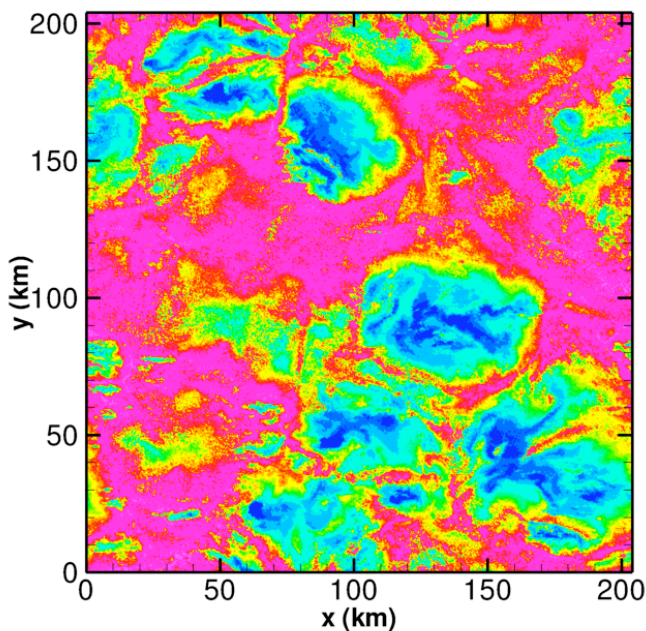
SFS field = red-blue  $\Rightarrow$  “SGS” in CRMs

Total Giga-LES field

filter width = 4 km

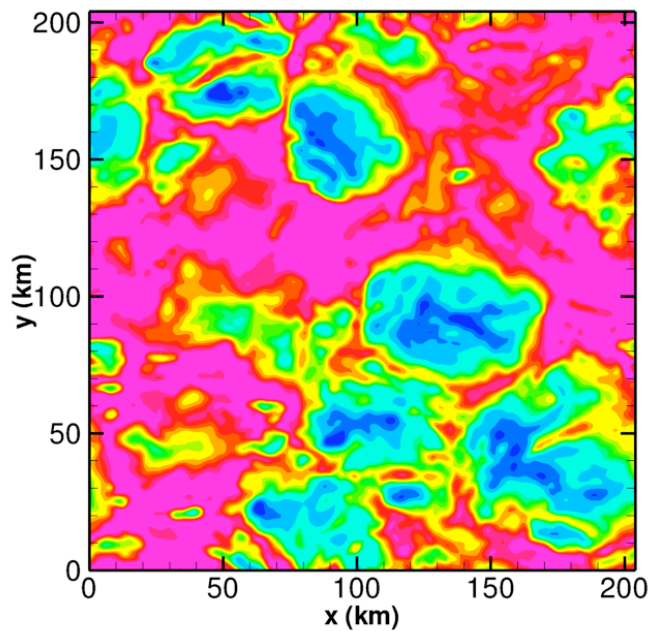
$\tilde{q}$  (FS)

total qv field (resolved in Giga-LES)

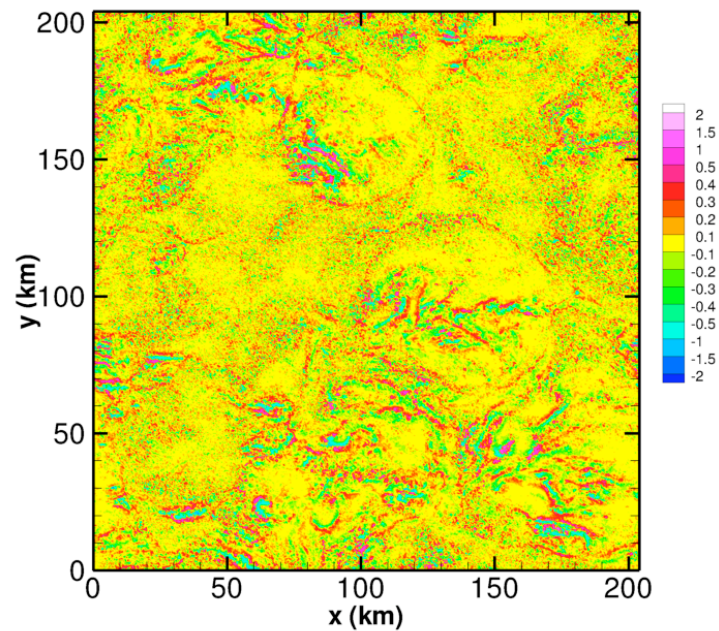


$q \rightarrow \tilde{q}$  (SFS)

FS of qv (filter width=4 km)



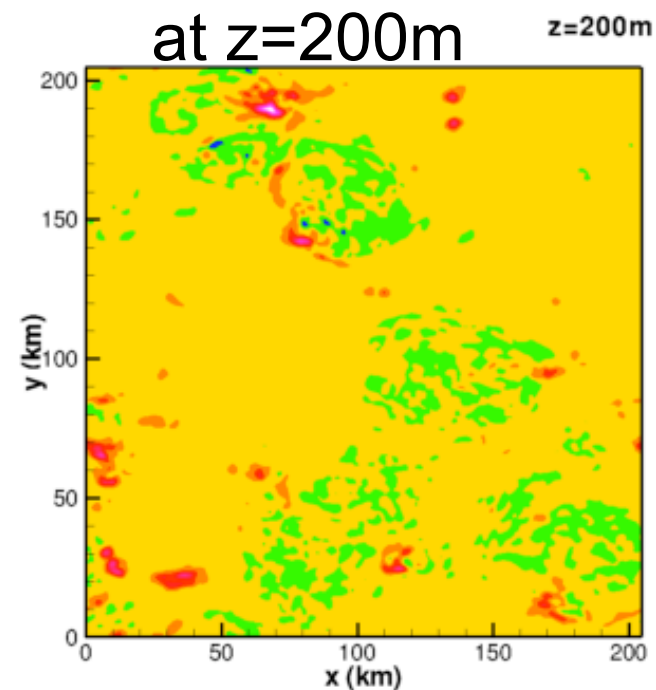
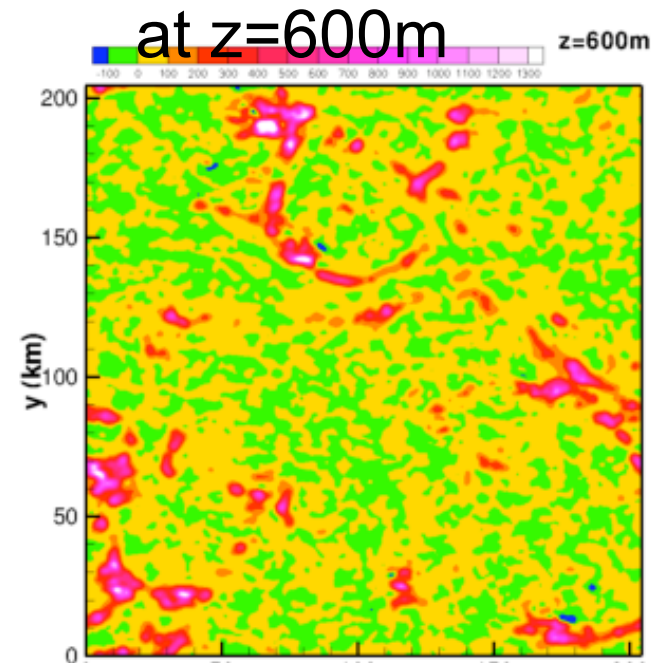
SFS of qv (filter width=4 km)



# Retrieved SFS fluxes from Giga-LES

$$\tau_{wq} = \widetilde{wq} - \tilde{w}\tilde{q}$$

SGS flux



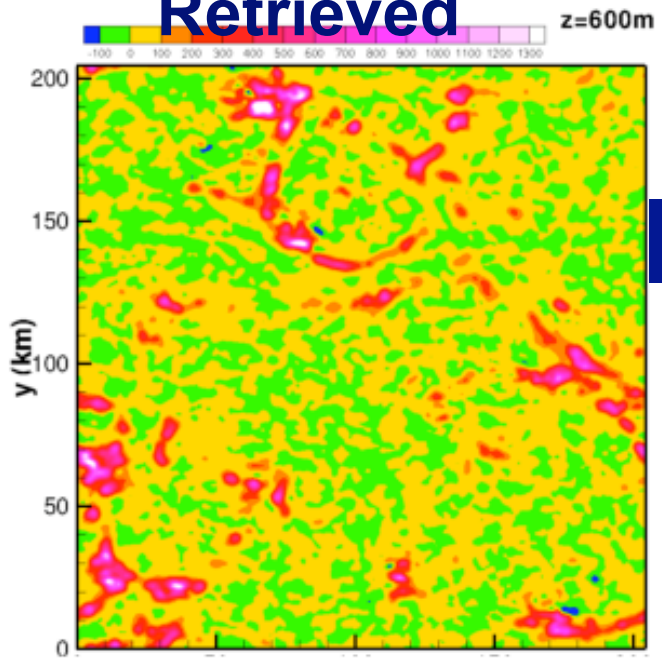
# Evaluate current SGS schemes in CRMs:

Example: Eddy diffusivity model

$$\tau_{wq} = -K \partial \tilde{q} / \partial z$$
$$K = 0.1 e^{1/2} \ell$$

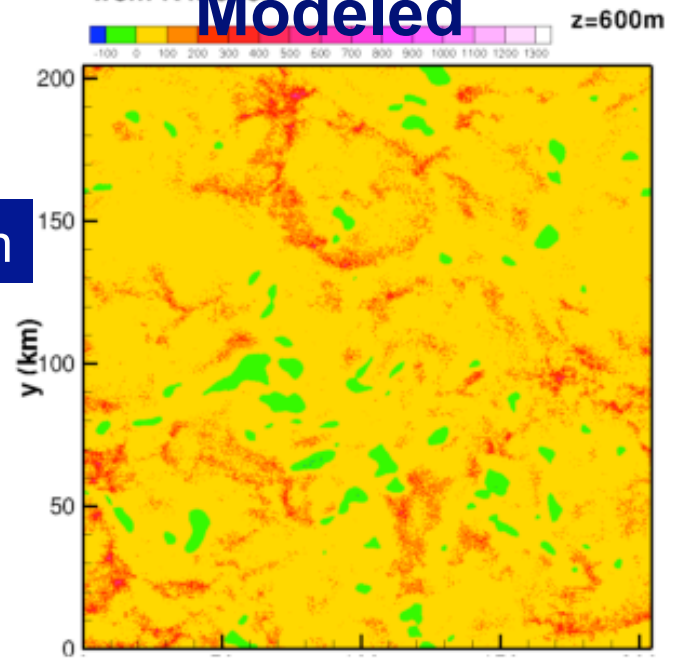
This modeled  $\tau_{wq}$  can be computed from  
the Giga-LES field  $\tilde{q}$  and  $e$  except  $\ell$  .

**Retrieved**

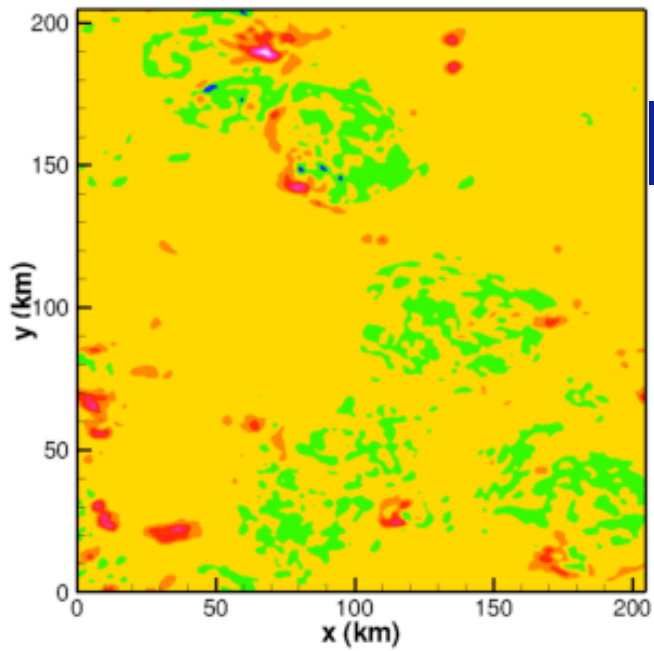


at z=600m

from K model  
**Modeled**

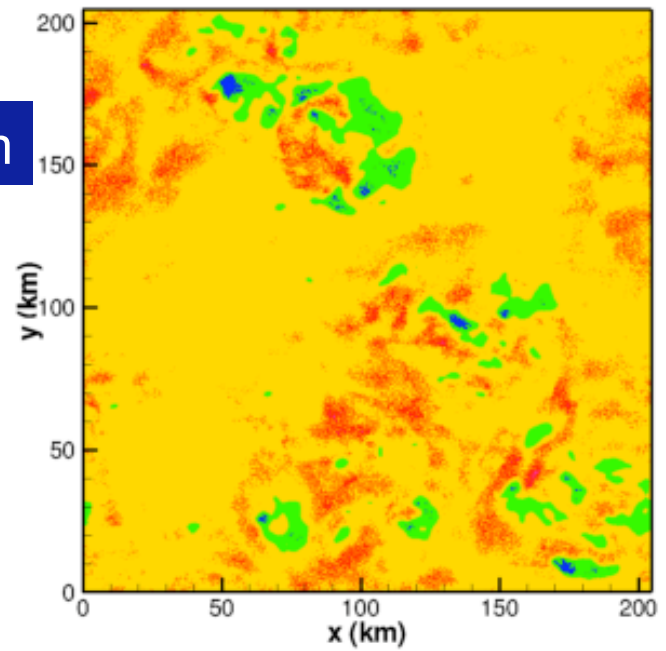


z=200m



at z=200m

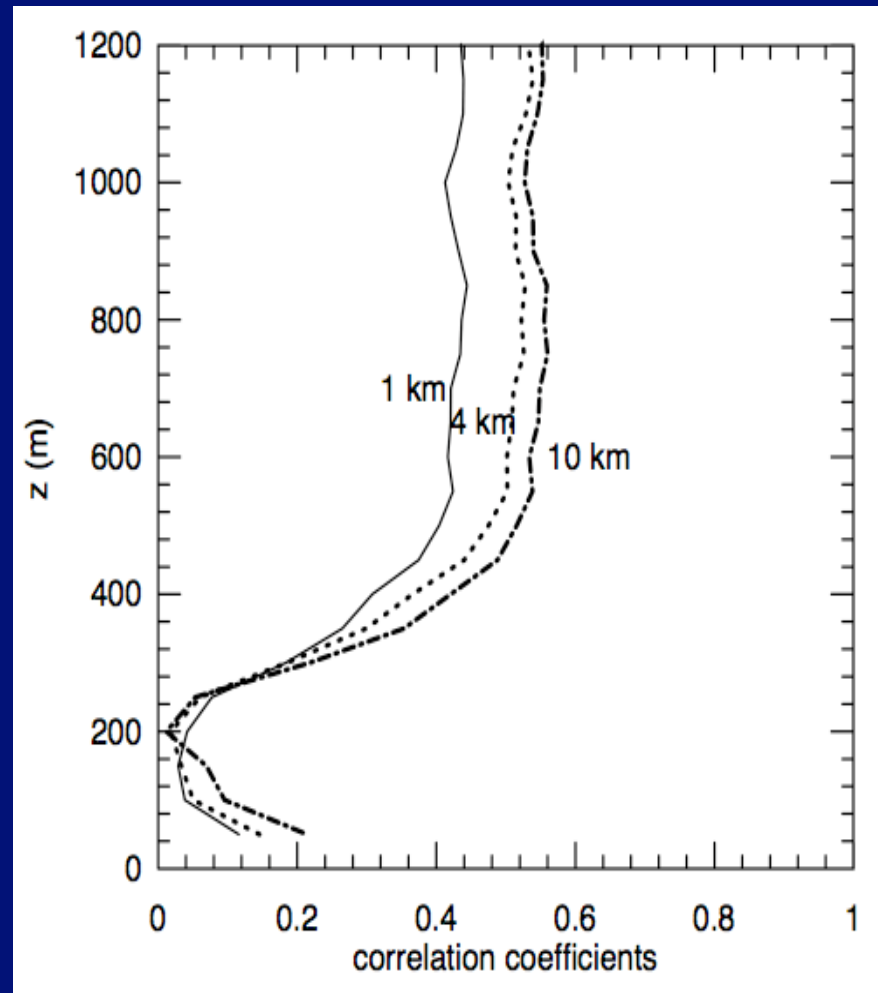
z=200m



# Correlation coefficients between retrieved and modeled SGS fluxes

lower cloud layer

PBL



# Giga-LES dataset

Available at:

- CMMAP Digital Library
- NCAR Mass Storage System

(mss:/MOENG/CMMAP\_SAM6.7SR\_OUT3D\_netCDF)

**Poster Session by Nicole Ngo (SOARS):**

**“The effects of convection on scalar transport in the troposphere”**