

# Grid-size dependence of shallow Cu simulations

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- Based on RICO case described by Abel & Shipway:  
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# Grid-size dependence in a large-domain LES

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- **RICO trade wind cumulus case:** 19 Jan 2005
- **University of Utah LES model** (Zulauf 2001)
- **Control simulation:** 100 m horizontal grid size, 40 km x 40 km domain, 24 h simulation
- **Grid-size dependence simulations:** 500 m, 1000 m, 2000 m, 4000 m horizontal grid sizes
- **Subgrid-scale turbulence length scale dependence simulations:** length scale is given on plots

$$(dx*dy*dz)^{(1/3)}$$

sgstke average from hour 13 to 24

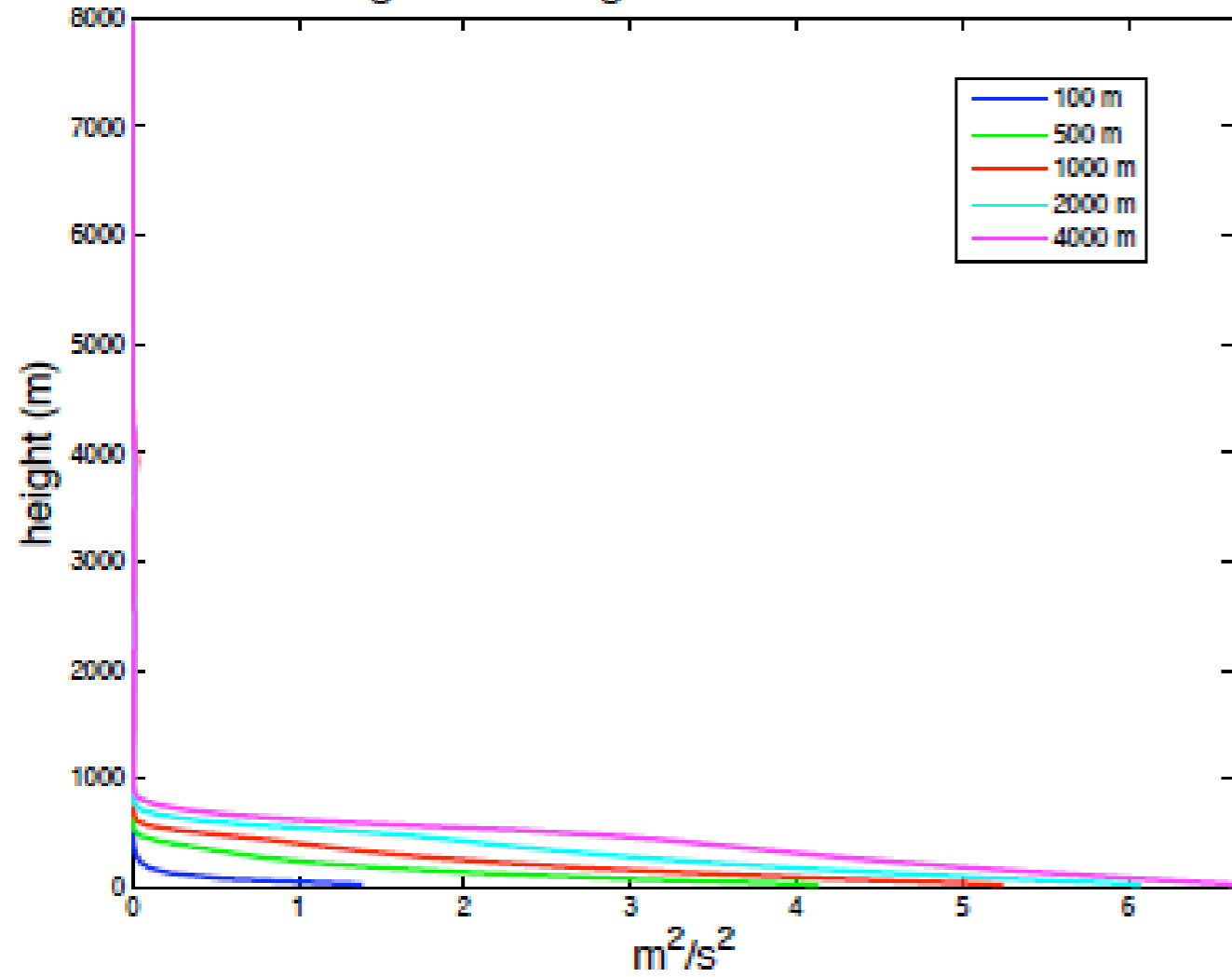


Figure 21: Subgrid TKE

$$dz$$

sgstke average from hour 13 to 24

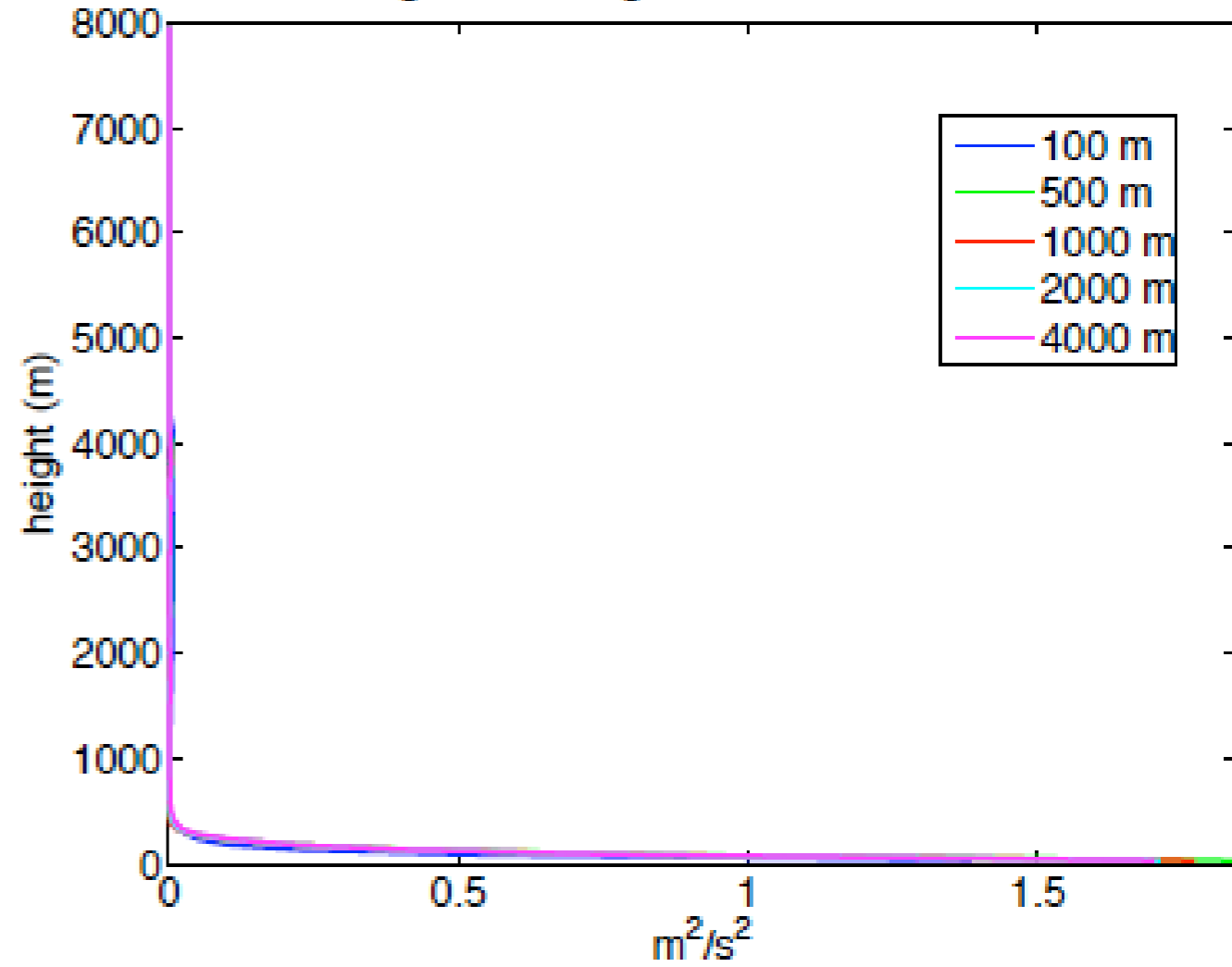


Figure 21: Subgrid TKE

$$(dx*dy*dz)^{(1/3)}$$

dz

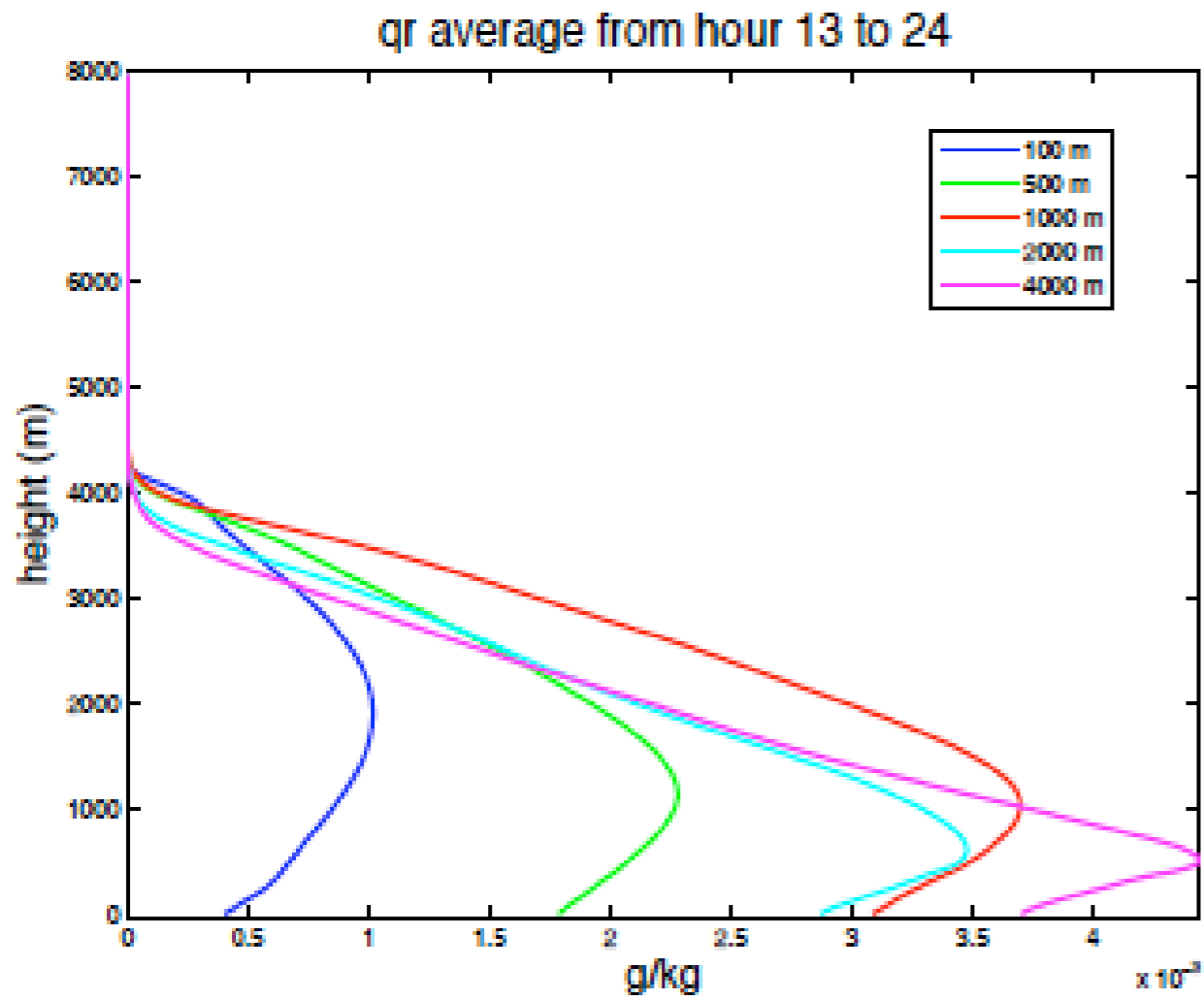


Figure 6: Rain water

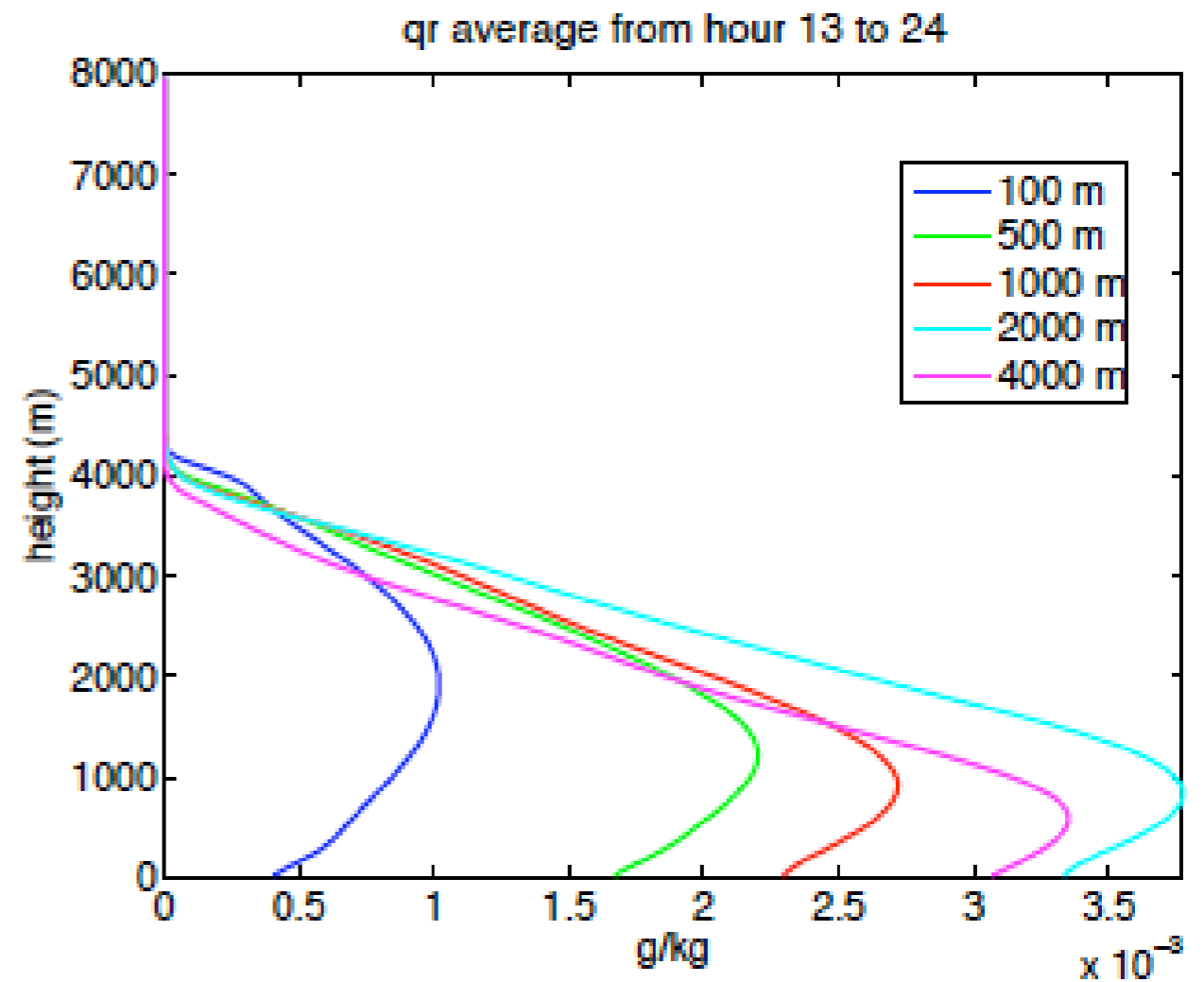
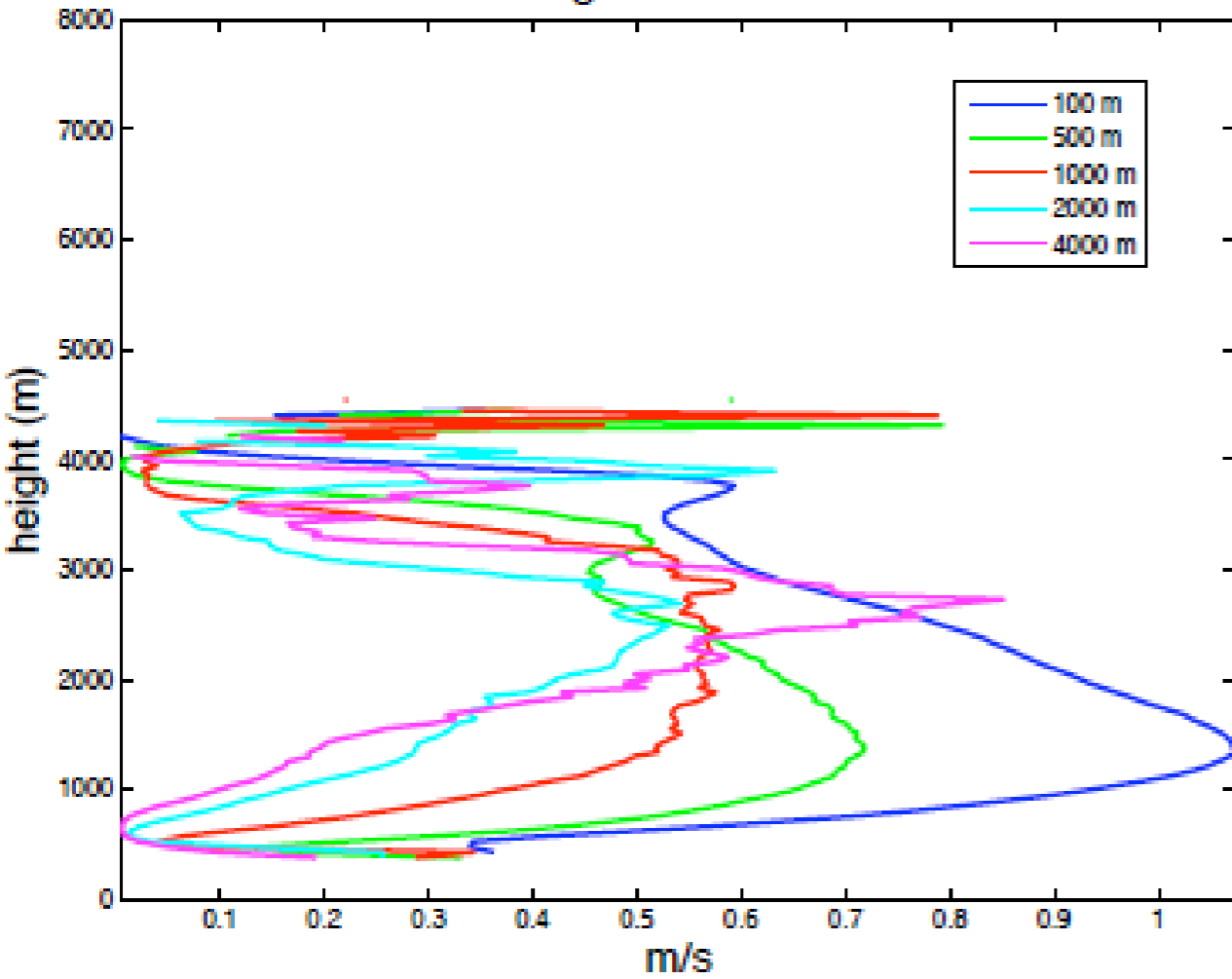


Figure 6: Rain water

$$(dx*dy*dz)^{(1/3)}$$

dz

wcld average from hour 13 to 24



wcld average from hour 13 to 24

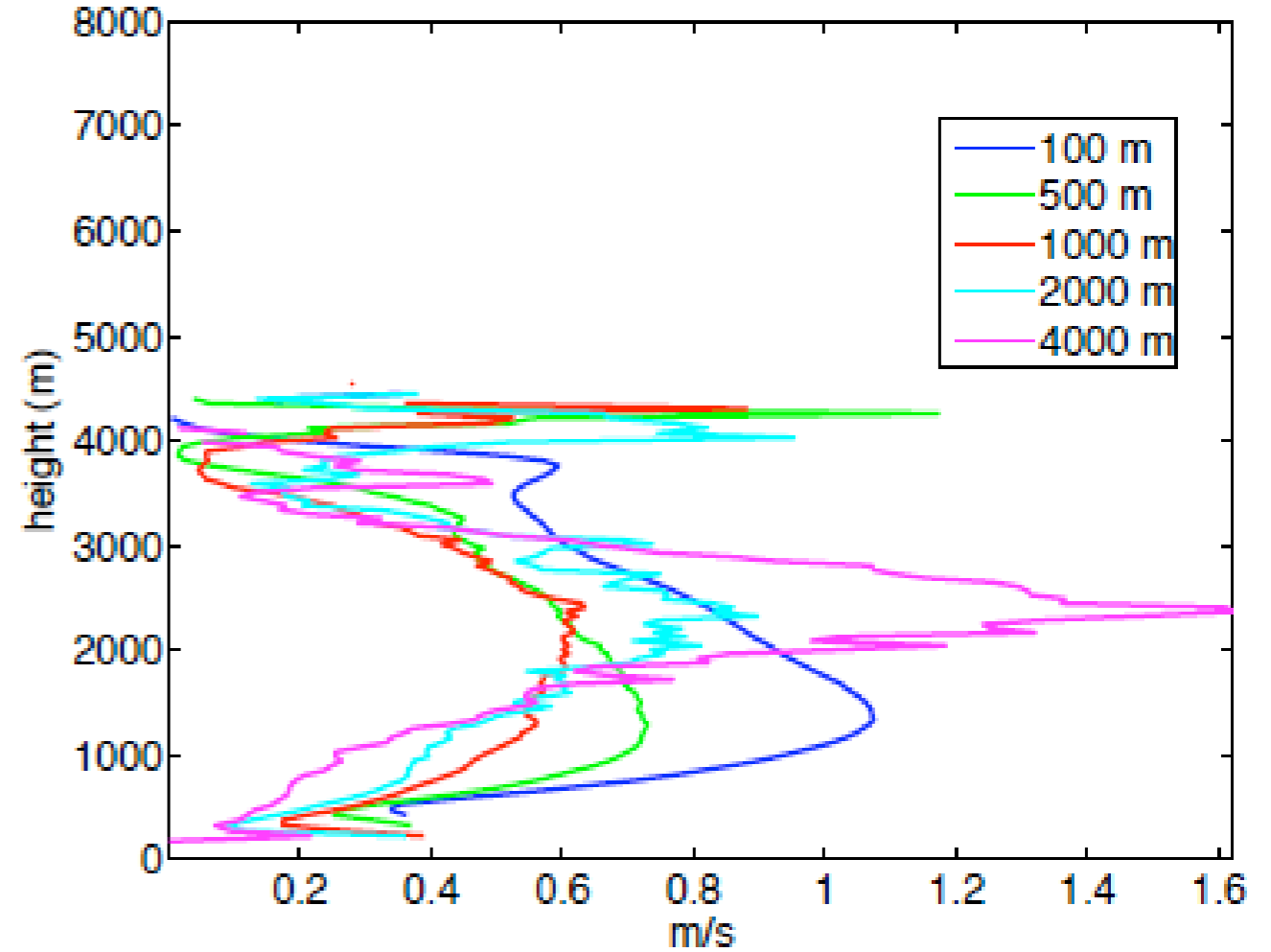


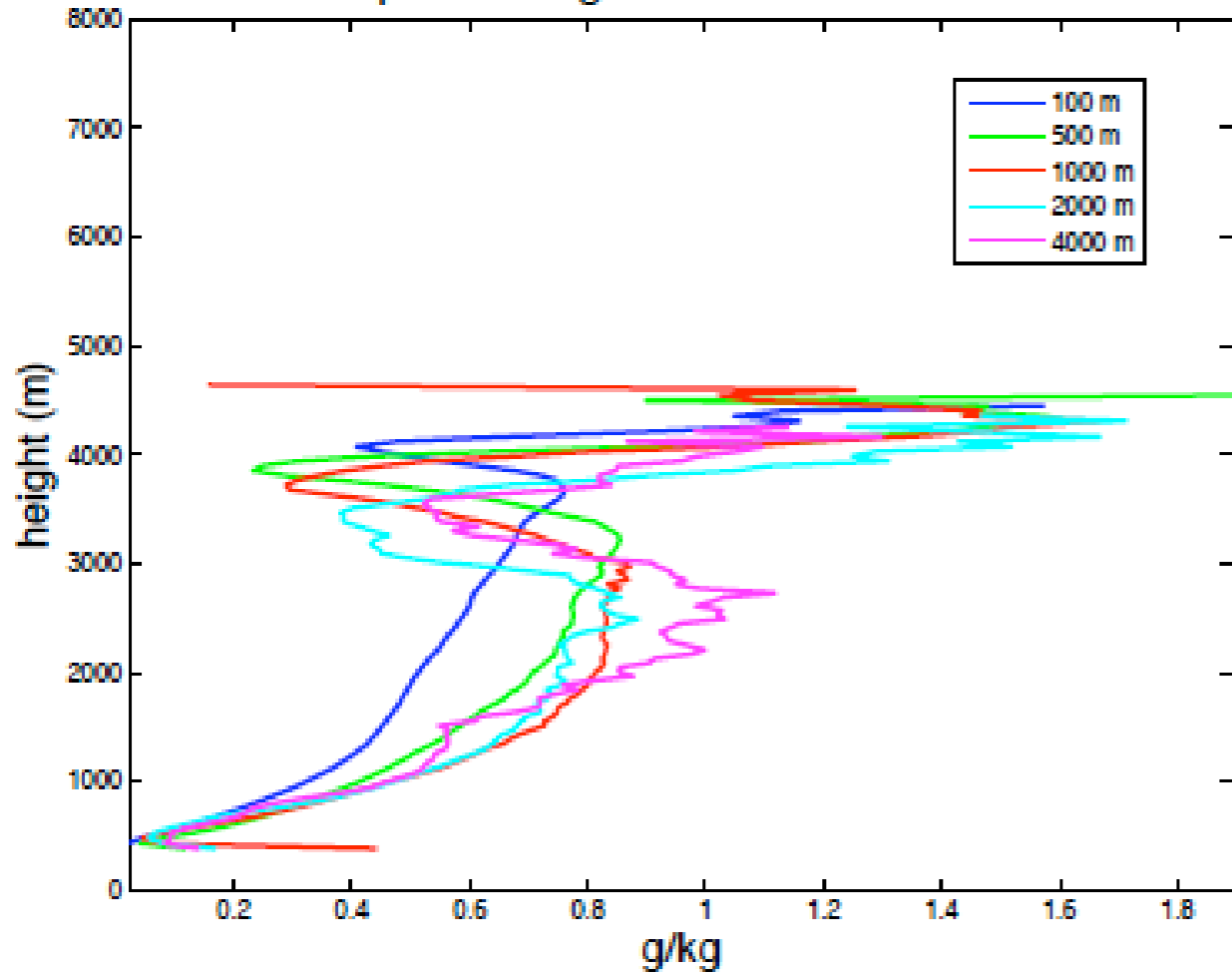
Figure 30: Average over all cloudy grid points of  $w$

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$$(dx*dy*dz)^{(1/3)}$$

dz

qlcld average from hour 13 to 24



qlcld average from hour 13 to 24

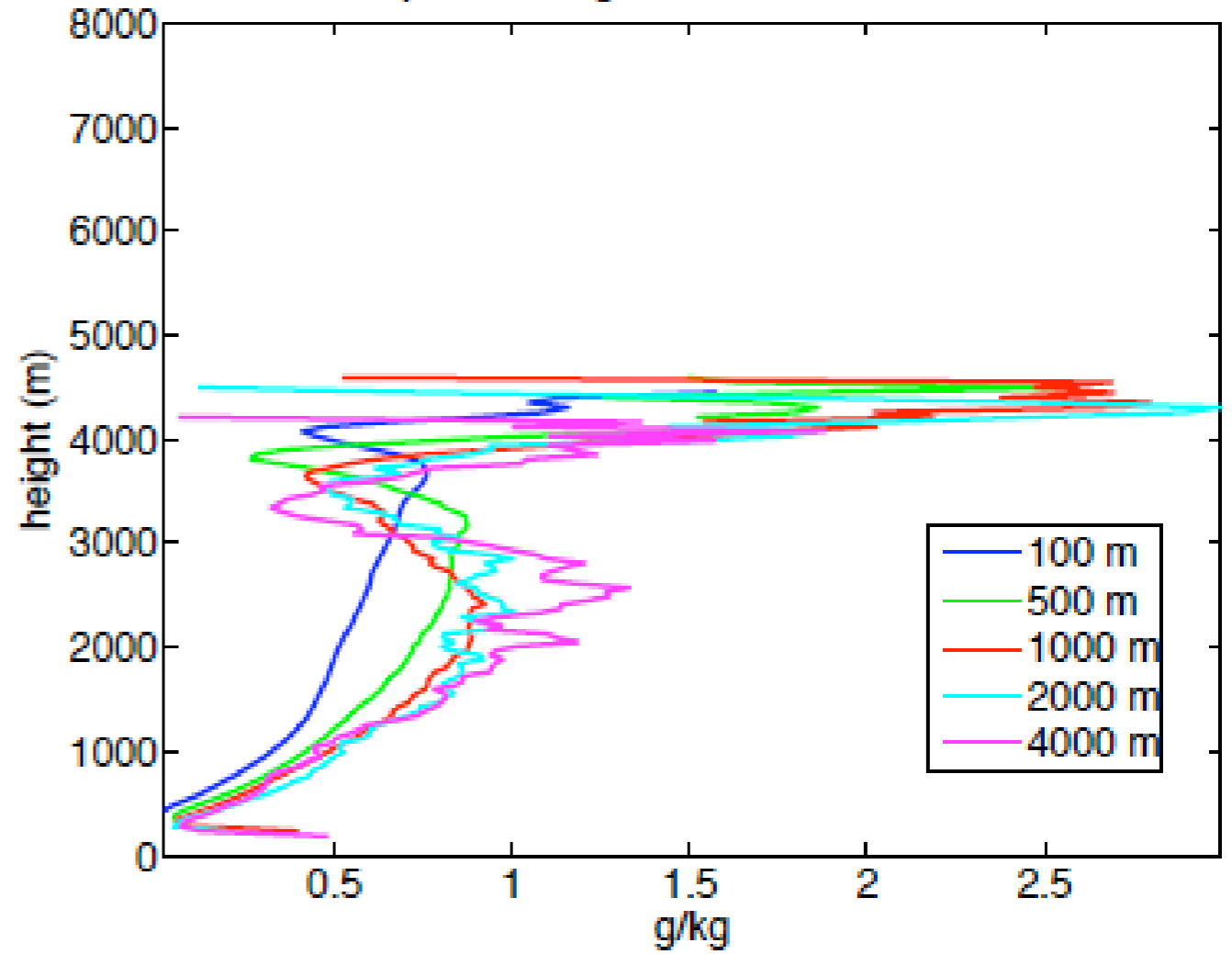


Figure 33: Average over all cloudy grid points of  $q_l$

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$$(dx*dy*dz)^{(1/3)}$$

totwqt average from hour 13 to 24

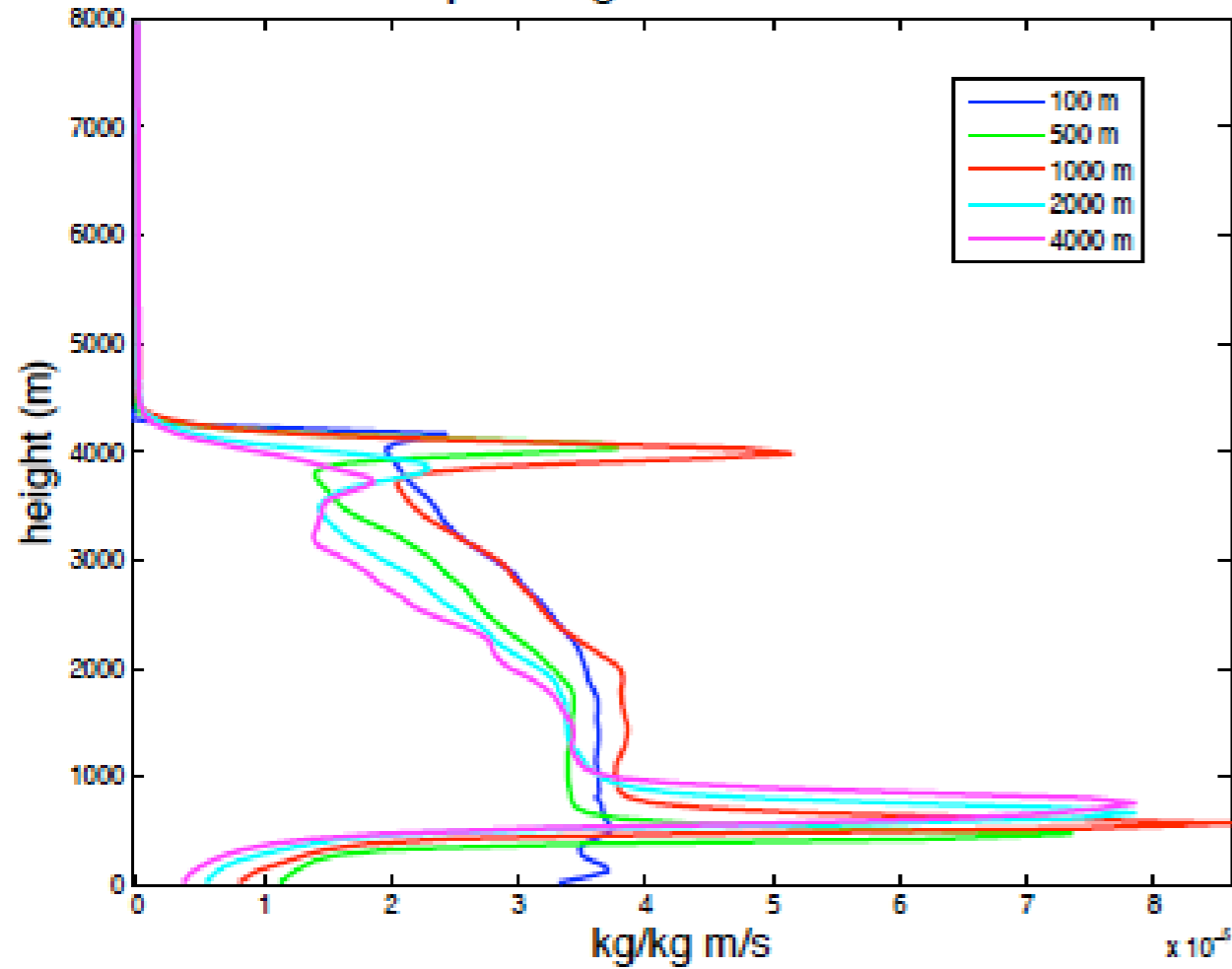


Figure 15: Total  $q_t$  flux, including subgrid-scale

$$dz$$

totwqt average from hour 13 to 24

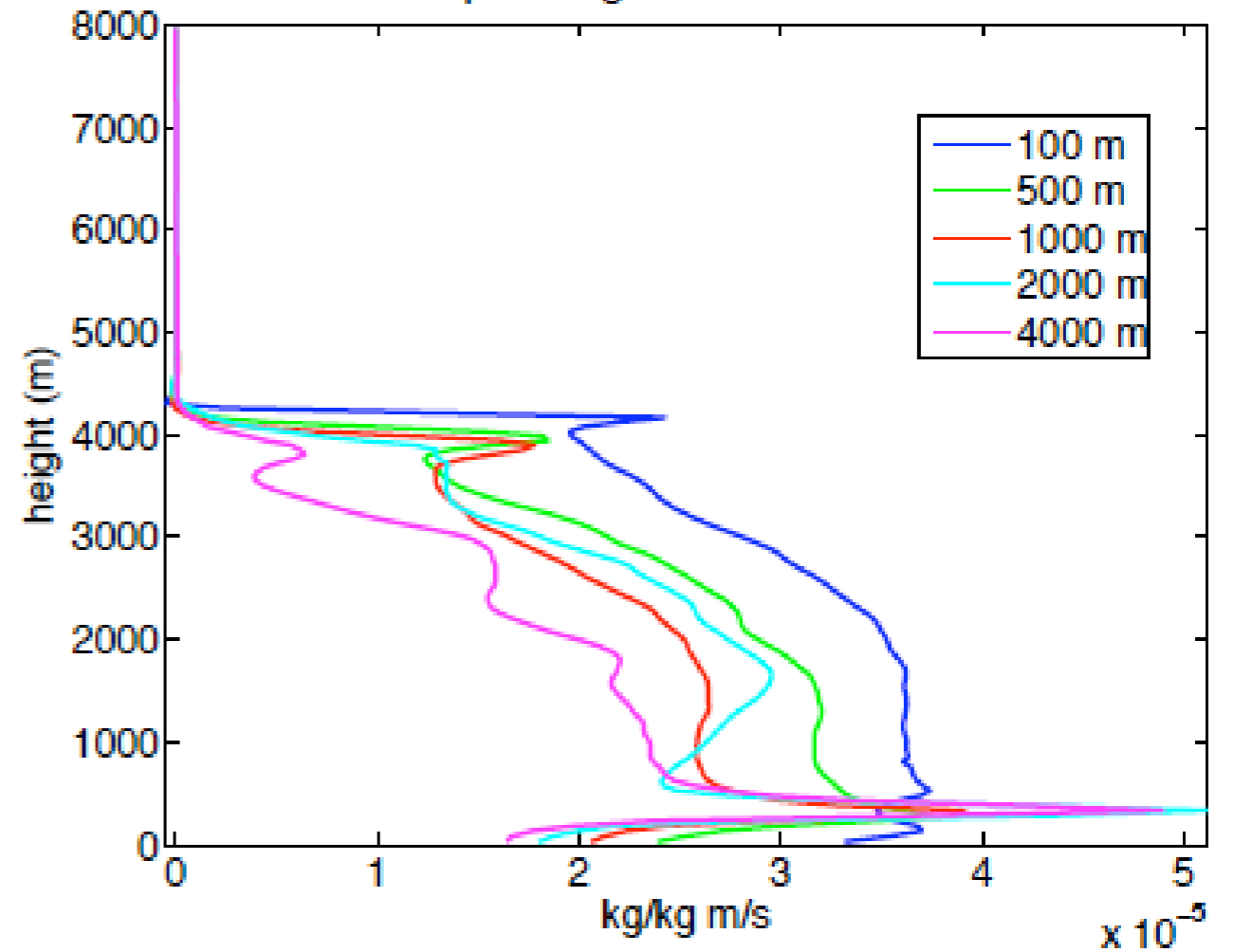


Figure 15: Total  $q_t$  flux, including subgrid-scale

$$(dx*dy*dz)^{(1/3)}$$

dz

sgswqt average from hour 13 to 24

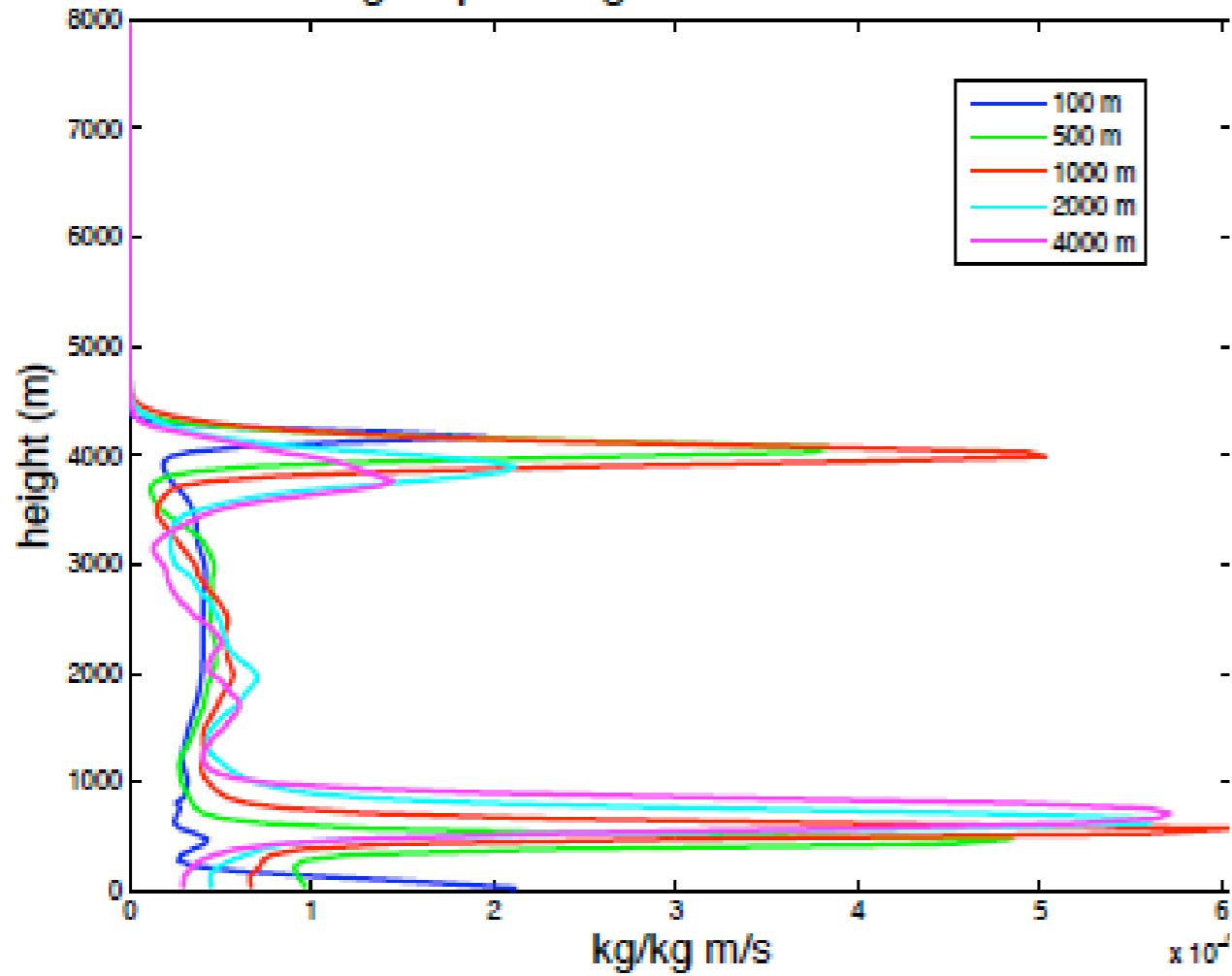


Figure 16: Subgrid-scale  $q_t$  flux

sgswqt average from hour 13 to 24

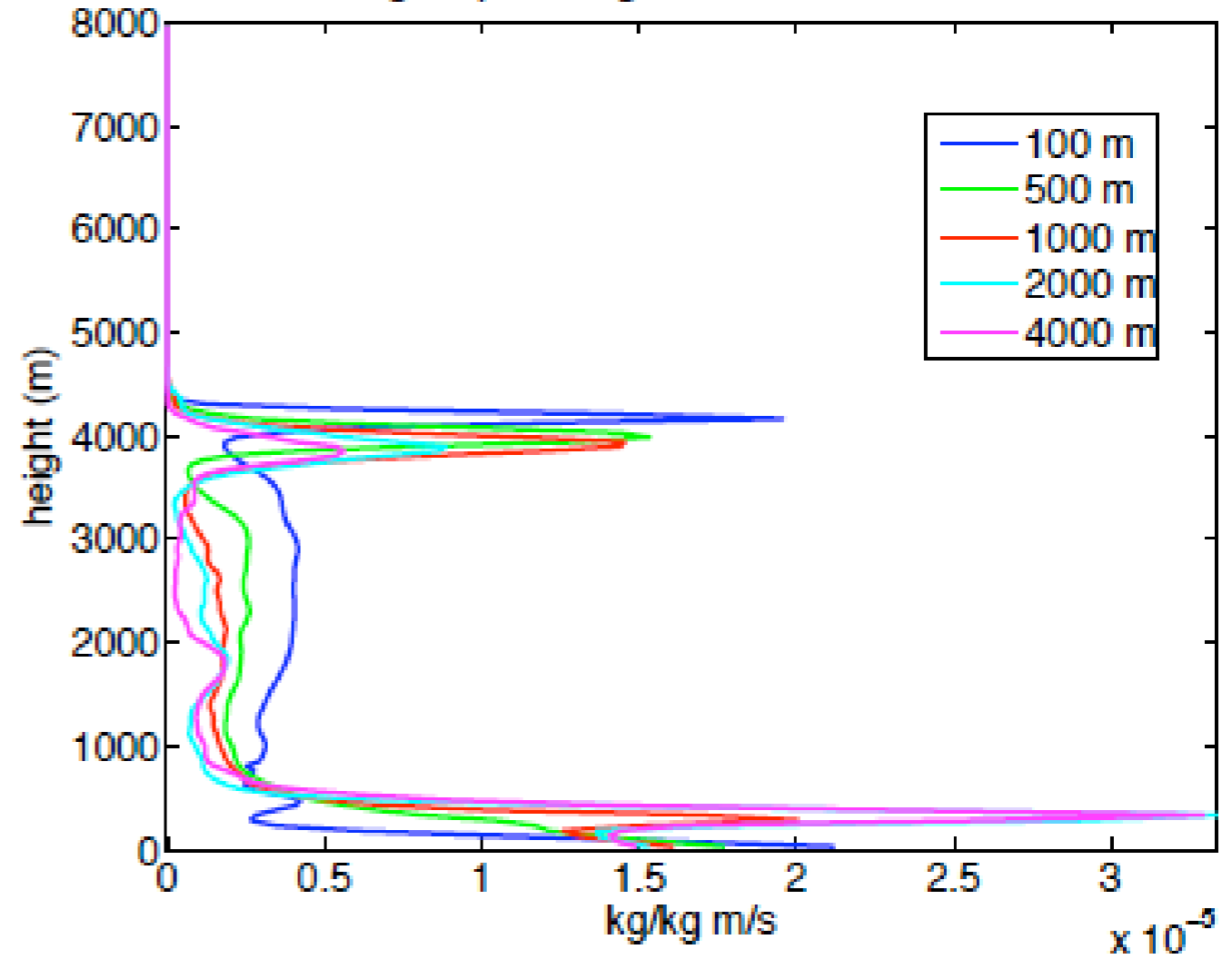


Figure 16: Subgrid-scale  $q_t$  flux



$$(dx*dy*dz)^{(1/3)}$$

dz

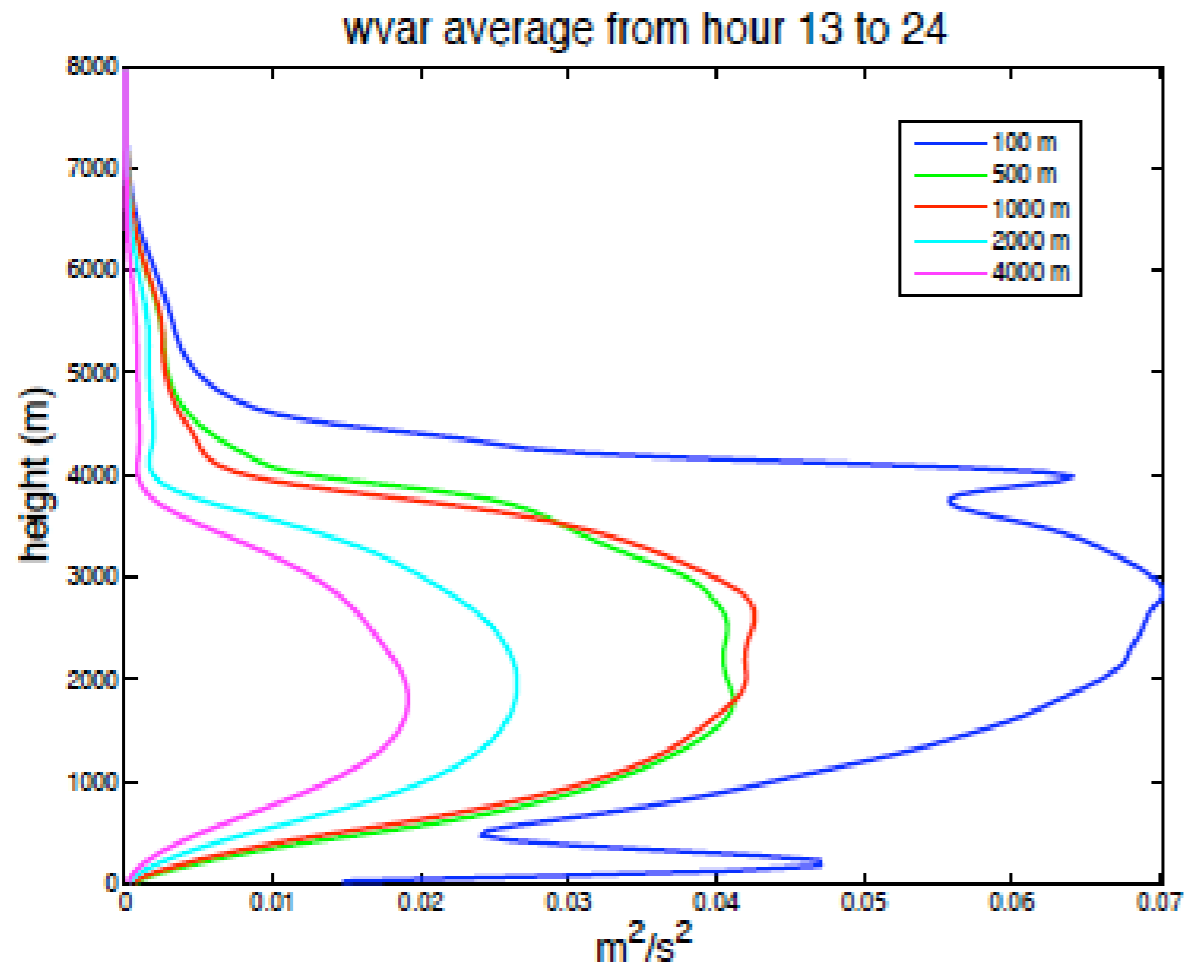


Figure 9: Resolved variance of the vertical wind

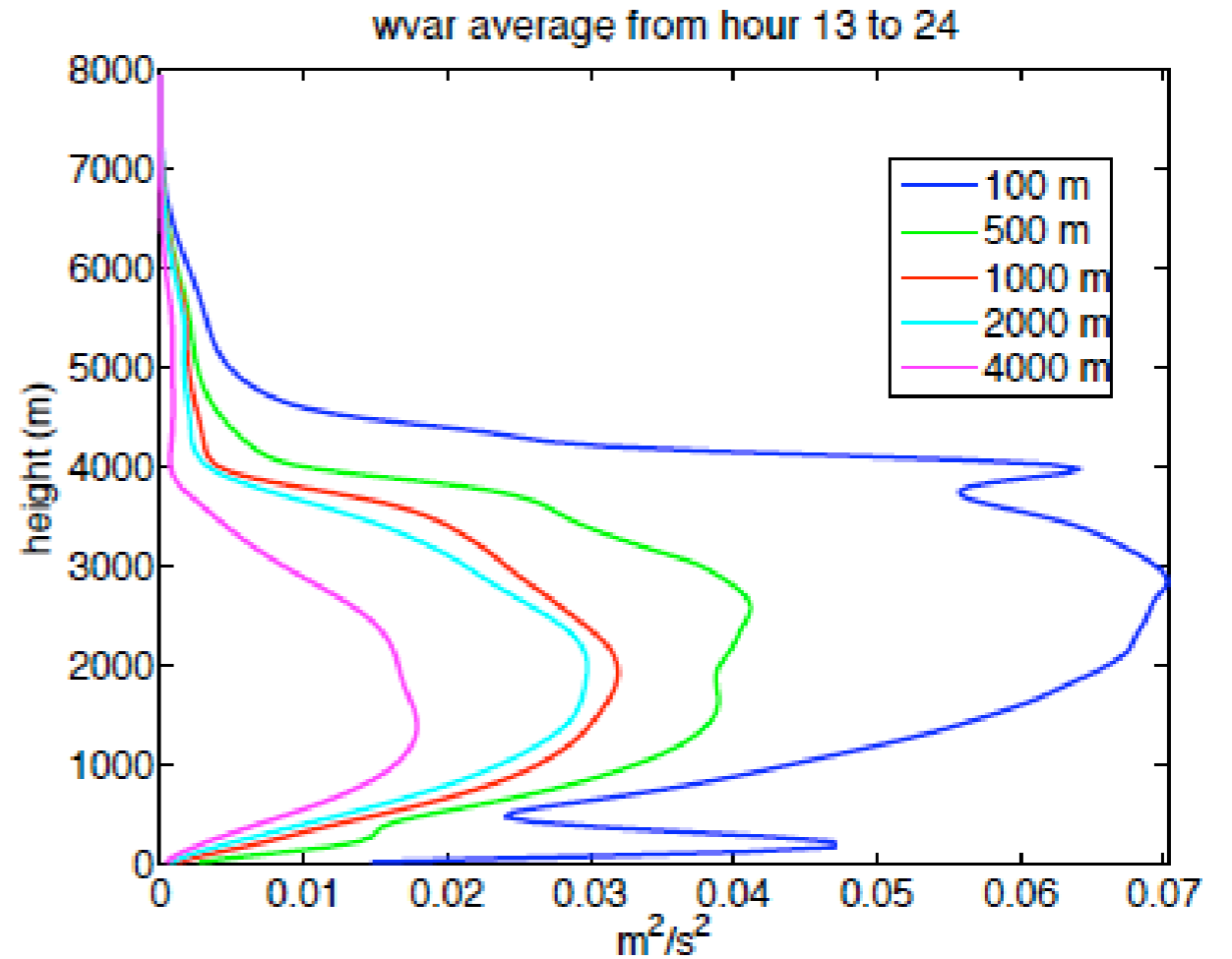


Figure 9: Resolved variance of the vertical wind

