Surface flux diagnostics

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WGNE Surface Flux Intercomparison

• July 2018 and January 2019; 0, 6, 12, . . . , 120 hours

	Contact person	Data format	Comments
СМА	Jian Sun	NetCDF	No 'LS_SNOW', 'CO_SNOW', 'TH_NET_CS', 'U_MOM_FL', 'V_MOM_FL' EVAP, SH, LH opposite sign
CPTEC	Ariane Frassoni		Dataset to be provided
DWD	Günther Zängl	NetCDF	
ECCC	Ron McTaggart-Cowan	NetCDF	2 datasets provided (oper + new) U_MOM_FL, V_MOM_FL opposite sign
ECMWF	Souhail Boussetta	GRIB	
MF	François Bouyssel	GRIB	
NCEP	Weizhong Zheng	NetCDF	No 'LS_SNOW', 'CO_SNOW', 'SO_NET_CS', 'TH_NET_CS'
NRL	Carolyn Reynolds	NetCDF	No 'SO_NET_CS', 'TH_NET_CS' EVAP, SH, LH opposite sign
RU	Mikhail Tolstykh	NetCDF	No 'EVAP', 'SO_NET_CS', 'TH_NET_CS'
UKMO	Paul Earnshaw	NetCDF	No 'SO_NET', 'TH_NET', 'SO_NET_CS', 'TH_NET_CS', 'U_MOM_FL', 'V_MOM_FL' U10, V10 inverse

diagnostics: familiar approach



b) HIGH RESOLUTION CESM



Advantages

- enables global assessment
- model vs observation differences easy to see

Disadvantages

- model fluxes are parameterized and based on multiple inputs
- sources of error are not apparent

$$LH = \rho C_e L_v |V| (q_{SST}^* - q_a)$$
Determinant inputs

diagnostics: familiar approach



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Dependent of the second s

diagnostics: conditional sampling approach



Advantages

- separates inputs from parameterization
- can focus on regions with particular cloud type or large bias
- can be applied to model output and point measurements



 $LH = \rho C_e L_v \left| V \right| \left(q_{SST}^* - q_a \right)$ parameterization inputs

example: GCM output



- differences in shading reflect parameterization differences
- differences in contours reflect differences in winds, SST, and/or ${\rm \Delta}q$

strategy for intercomparison data



- average 06, 12, ..., 120-h variables for all common initializations
- compute diagnostic for all averaged 06, 12,, 120-h leads
- track mode for each lead time; overlay 120-h minus 00-h PDF difference

NCEP: first looks for 201807



- thermodynamic drivers inversely proportional to wind speed
- PDF shifts to stronger winds, weaker thermodynamics
- non-zero flux differences: stability changes?

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example: direct covariance measurements EUREC4A / ATOMIC

