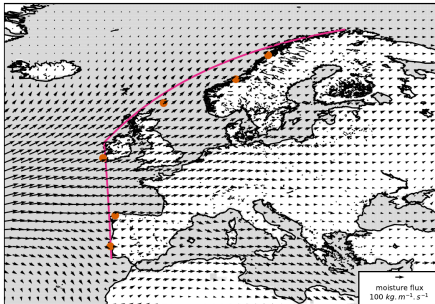


Upstream of Hydroclimate Extremes : Maxima of Moisture Transport

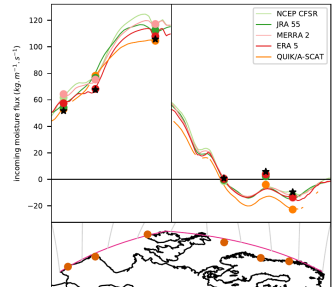
Ambroise Dufour, Sergey Gulev (Shirshov Institute, Moscow), Olga Zolina (University of Grenoble)

Climatology of water vapour transport across Europe's Atlantic border

- reanalyses : NCEP CFSR, JRA 55, MERRA 2 and ERA 5
- satellites : QUIKSCAT and ASCAT
- in situ : IGRA radiosoundings



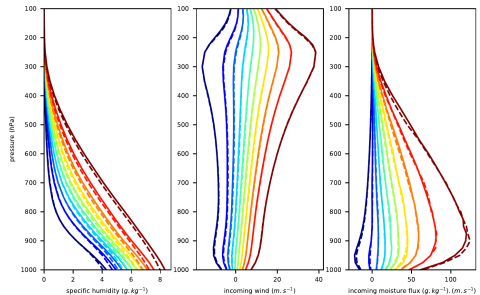
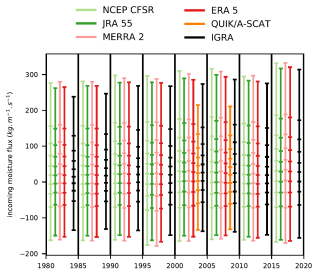
- vertically integrated moisture fluxes 2000-2011 climatology in ERA 5 (black arrows)
- radiosonde stations (orange dots) along the Euro-Atlantic boundary (magenta)



- vertically integrated moisture fluxes 2000-2011 climatology according to reanalyses and satellites
- black stars : radiosondes

Distribution, decadal variability and breakdown of trends

- averaging over vertically integrated moisture flux deciles to compare distributions
- $\overline{qv} = \bar{q} \bar{v} + \text{Cov}(q, v) \Rightarrow$ breakdown covariance via composites along said deciles
- for the i^{th} decile, $\overline{qv_i} \approx \bar{q_i} \bar{v_i} \Rightarrow \overline{qv_i}$ changes in fact driven by $\bar{q_i}$



- vertically integrated moisture fluxes
- graduation marks : decile averages
- five year periods
- at location of radiosondes

- composites of humidity (left), wind (center) and moisture flux
- conditional on vertically integrated moisture flux deciles (ERA-I)
- dashed line : 1979 linear estimate
- bold line : 2018 linear estimate

Thank you for your attention ! Send questions at dufour@sail.msk.ru