AMV/AMOC decadal to centennial scale variability:

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Outline

- Drivers of AMV 20th century changes: externally forced versus internal variability (CMIP5 historical simulations)
- Can we better constrain past/future AMV/AMOC changes?
 - Can AMOC explain some of the MCA/LIA changes?
 - MOW, NAO and AMOC
- Statistical significance of short term trends
- Summary

□ Ratio of forced to total decadal SST variance



□ AMV(OBS ERSST) and its spatial variations



□ NATL SST 20th Century forced response evolution



Ting et al. 2009 CMIP3, Terray 2012 CMIP5

□ NATL SST 20th Century forced response pattern













Some interesting questions

- MCA (950-1250) and LIA (1400-1700): any role for the AMOC ?
- Future changes in MOW and their impact on the N.Atlantic
- How to constrain future AMOC changes ? Metrics based on processes

□ Use data assimilation (particle filter) to reconstruct past climates Data: Mann et al. 2009 Model: Loveclim (Goosse et al. 2010)



Goosse et al. Clim.Dyn 2012



AMOC reduction of 0.3 Sv during the MCA compared to LIA (negative feedback)



□ Impact of future changes in MOW ?

Salinity at 1000m



Lozier & Stewart, 2008

Adloff et al. 2013, NEMO/MED8





Lozier & Stewart, 2008



AMOC Variability: Dynamics and Impacts - U.S AMOC/U.K RAPID, 2013 Meeting □ Global mean temperature: HadCRUT4 and CMIP5 models ר1.5 ŀ 0.5 0 0.5[.] 1900 1950 2000

Assume AR1 residual with one-yr lag correlation of .4



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From Karina Von Schuckmann



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Summary

- GHG and AER forced response: spatial pattern uncertainty, additivity of forcings
- Internal variability: patterns and amplitude
- Need to analyze separately low and high latitude regions
- Need to develop robust model/obs consistency check/test
- Use of data assimilation to reconstruct past climates
- How to constrain future AMOC changes ? Metrics based on processes
- Influence of Arctic and Mediterranean as well as connections with other basins

