Lessons learned using satellite data, future needs and recommendations

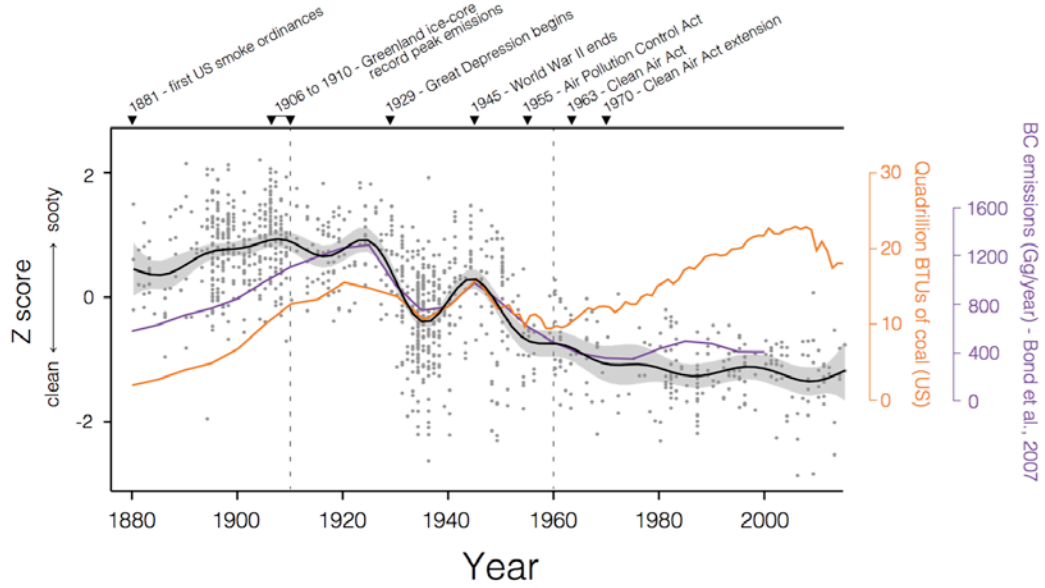
Michael Schulz, Jan Griesfeller

Norwegian Meteorological Institute

16th AeroCom workshop, Helsinki, 9 Oct 2017

Meteorologisk institutt

Suborbital BC measurements since 1900 => T R E N D S !!



Meteorologisk institutt

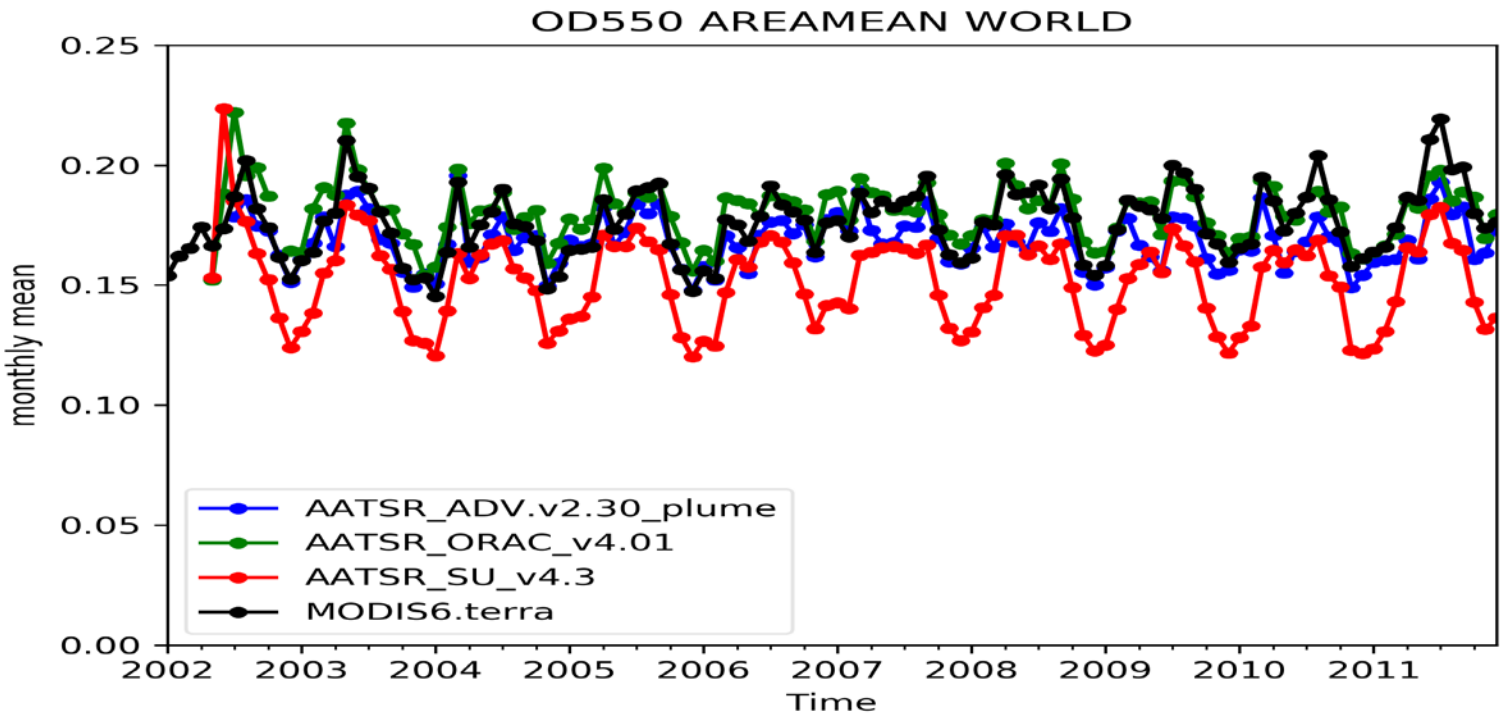
PNAS

Bird specimens track 135 years of atmospheric black carbon and environmental policy

Shane G. DuBay[a,b,1,2] and Carl C. Fuldner[c,1,2]

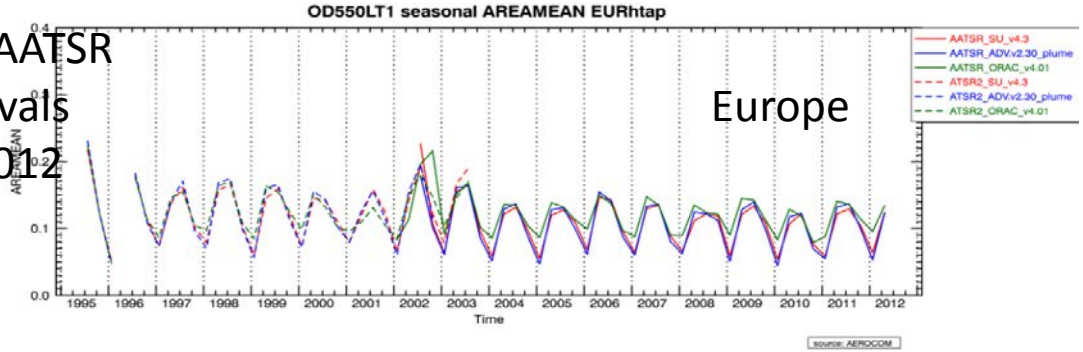
www.pnas.org/cgi/doi/10.1073/pnas.1710239114

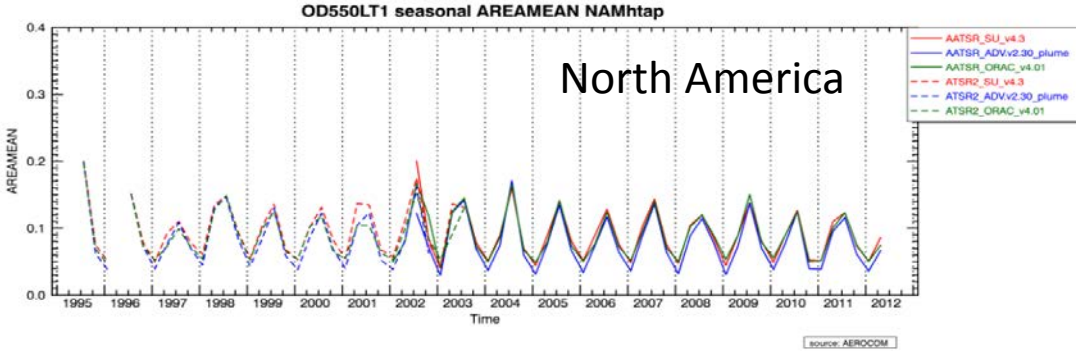
Trends

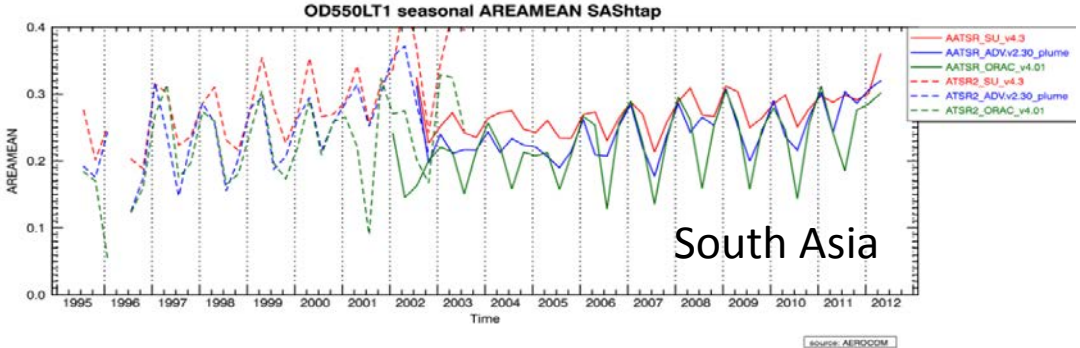


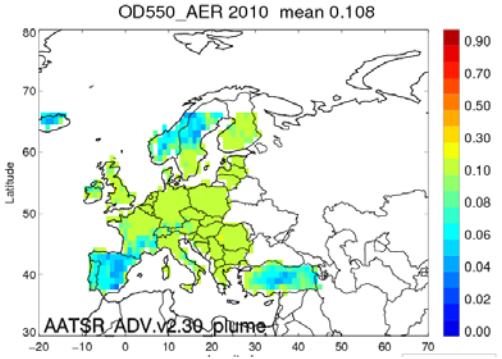
Meteorologisk institutt

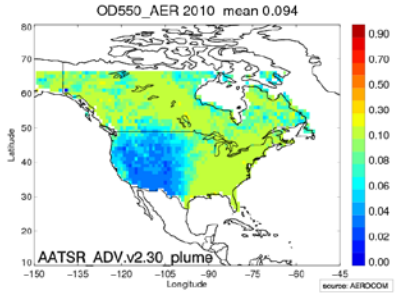
ATSR2/AATSR
3 retrievals
1996-2012

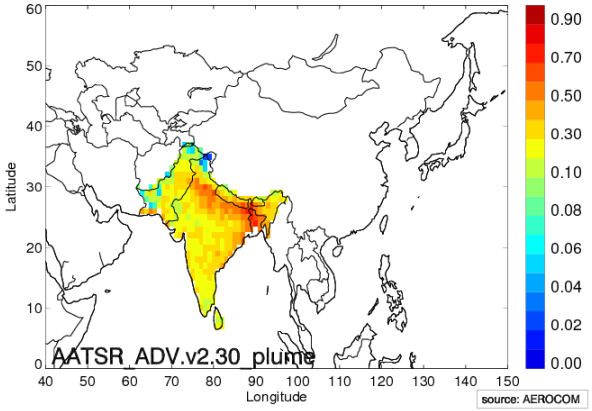












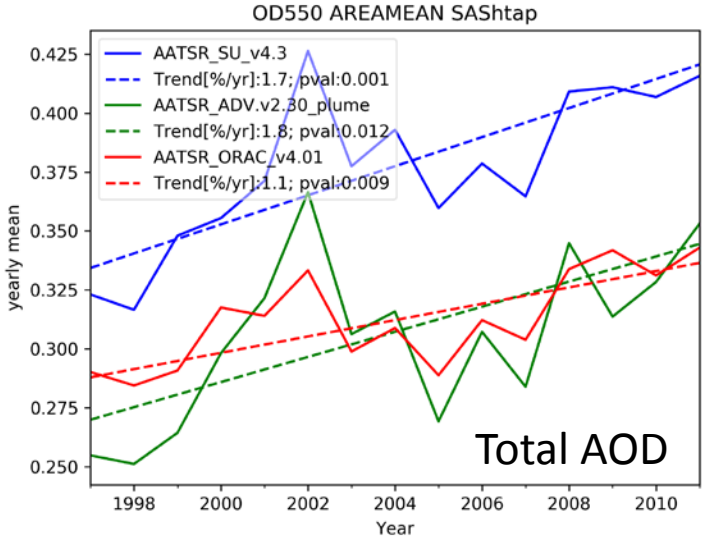
Meteorologisk institutt

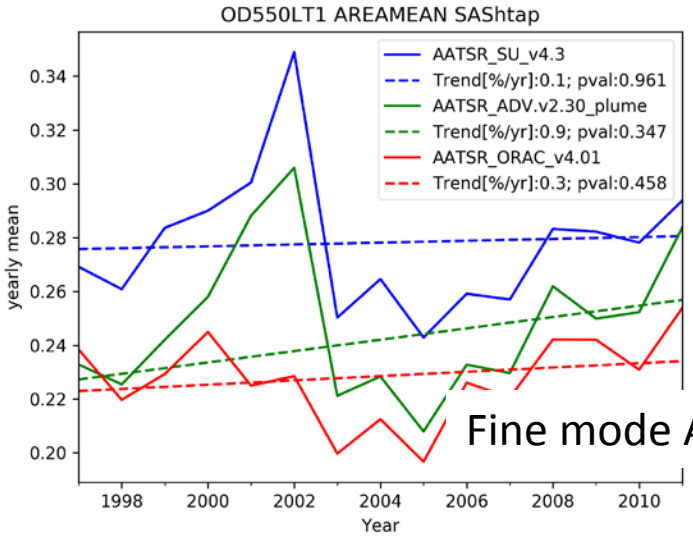
Significant Trends at 90% level, based on annual mean AOD in region
Three ATSR2/AATSR retrievals (SU, FI, OX)

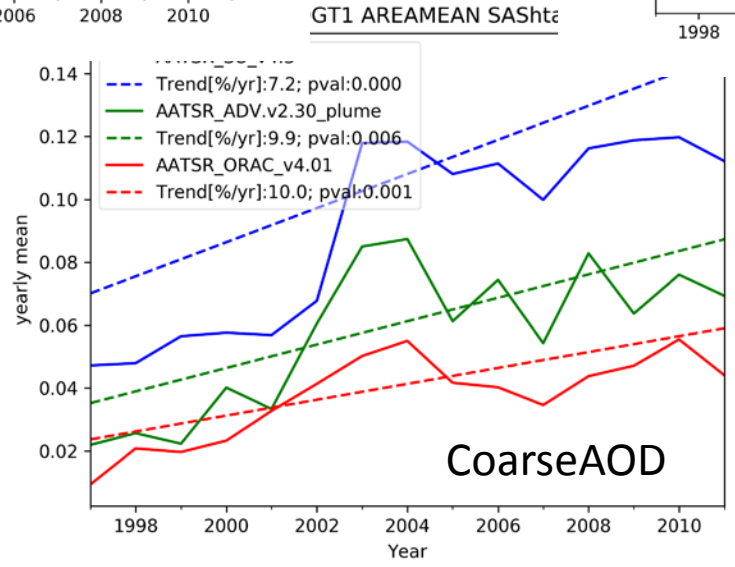
	AOD (1996-2011)			**AODfine** (1996-2011)			**AODcoarse** (1996-2011)		
% / year	*SU*	*FI*	*OX*	*SU*	*FI*	*OX*	*SU*	*FI*	*OX*
Middle East		**3.0**	**1.6**			0.8		13.0	
North Africa	-1.6			**-1.7**	**-1.3**	**-0.8**	-1.5	2.6	-2.0
South Asia	**1.7**	**1.8**	**1.1**				**7.2**	**9.9**	**10.0**
East Asia		0.8		-0.6			**1.5**	**5.9**	
North America								2.1	
Europe	**-1.0**	**-1.3**		**-1.4**	**-1.6**	**-0.7**			
Ocean	**-0.3**	**-1.2**			-3.3		-1.1	1.2	
Land	**-0.7**	**-0.5**		**-0.9**	**-1.2**	**-0.6**		2.3	
World	**-0.9**	**-1.0**		**-1.0**	**-2.7**		-1.2	1.5	

BOLD: all three retrievals agree in sign of trend

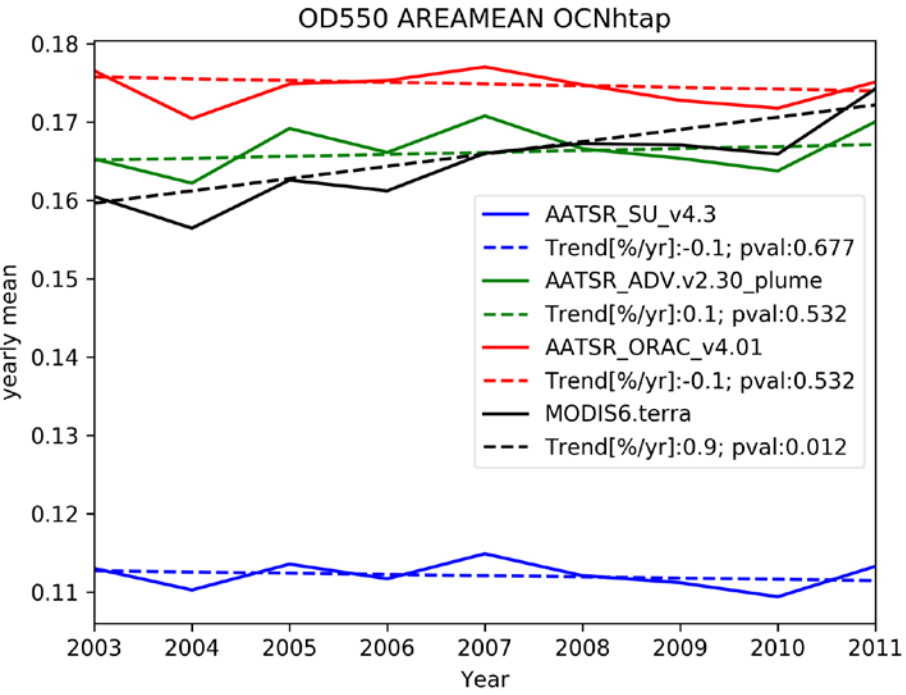
Meteorologisk institutt

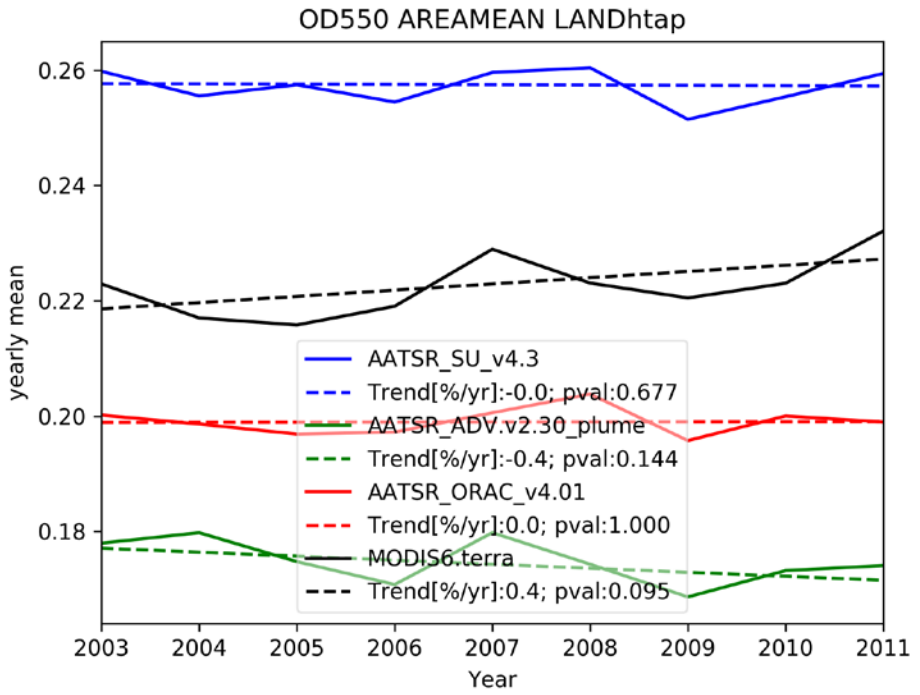






Meteorologisk institutt





Meteorologisk institutt

summary

- Bias between retrievals – not easy to digest
- Trends Modis/ATSR correlated – good!
- Trends start to emerge – great !
- ATSR2/AATSR overlap “complicated” => fake trends?
- More research on satellite overlap periods?
  Longer periods needed > 15 years

Meteorologisk institutt