

Schweizerische Eidgenossenschaft Confédération suisse Confederazione Svizzera Confederaziun svizra

Swiss Confederation



M. Collaud Coen

E. Andrews, C. Lund Myhre, J. Hand, M. Pandolfi, and P. Laj and the SARGAN group: trend analysis of aerosol radiative properties

### Analysed aerosol properties:

Scattering and backscattering coef. Absorption coef. Single scattering albedo Scattering and absorption Ångström exponent Backscattering fraction

### Methodology:

Detection of rupture by visual inspection + station history Mann-Kendall with three prewhitening methods Sen's slope LMS and GLS/ARB

Martine.collaudcoen@meteoswiss.ch

## Collaud Coen et al., ACPD, 2020

## Present day (2016-2018) scattering coef. trend



49% ss negative trends (mostly in Europa, North America)



## Present day (2016-2018) absorption coef. trend



#### 60% ss negative (also in Asia)

#### 36% not ss



## Present day single scattering albedo trends



ollaud Coen et a

÷

**MeteoSwiss** 

# Mean trend [%/y]

Regions	Scattering coef.			Absorption coef.			Single scattering albedo		
	nb tot/ss	all	SS	nb tot/ss	all	Ss	nb tot/ss	all	Ss
all	37/23	-2.11	-2.85	33/21	-2.94	-4.02	27/19	0.02	0.01
Africa	1/0	-4.6		1/1	-3.84	-3.84	1/0	-0.02	
Asia	3/0	-1.3		3/2	-3.31	-4.83	3/3	0.12	0.12
Europe	12/8	-2.92	-4.03	15/11	-3.72	-4.45	11/8	-0.03	-0.09
NAmerica	14/10	-2.66	-3.66	6/2	-1.85	-4.24	6/5	-0.01	-0.01
Pacific	2/1	0.96	3.57	2/1	-1.4	-3.74	2/1	0.13	0.27
Polar regions	5/4	0.15	-0.05	6/4	-2.25	-2.47	4/2	0.05	0.11

÷ ÷ çollaud Cœn et al,, ACPD, 2020 ት ት ት ት ት ት ት - የታ ረት MeteoSwiss 公 令 ф ф ф ÷ EGU, Mai 2020 ጭ ት ት ት ት ተ ት ሌሌ ÷ ÷

# Conclusion

- Decrease of aerosol burden
- Larger decrease of the absorption coef. (mainly driven by black carbon) than the scattering coef.
- 50% of ss positive SSA trend (increase of the aerosol negative climate forcing)
- 20% of ss negative SSA trend (decrease of the aerosol negative climate forcing).
- Environmental pollution regulations have positive effects for health and the environment but may have an adverse effect on efforts to reduce climate change.