United States Department of Agriculture (USDA)
Agricultural Research Service (ARS)
1420 Experiment Station Road
Watkinsville Georgia 30677 USA
Tel: 1-706-769-5631
Email: alan.franzluebbers@ars.usda.gov

Alan Franzluebbers

Ecologist

Air Quality

Recent Trends in Conservation Agriculture under Mediterranean Conditions

CIHEAM

Centre International de Hautes Études Agronomiques Méditerranéennes
International Centre for Advanced Mediterranean Agronomic Studies

Air Quality

Air-borne dust derived from exposed soil surface

Air Quality

Air-borne dust derived from exposed soil surface

Dust storms in the arid southwestern USA

http://z.about.com/d/phoenix/1/0/c/u/duststorm01.jpg

http://z.about.com/d/phoenix/1/0/c/u/duststorm01.jpg

Air Quality

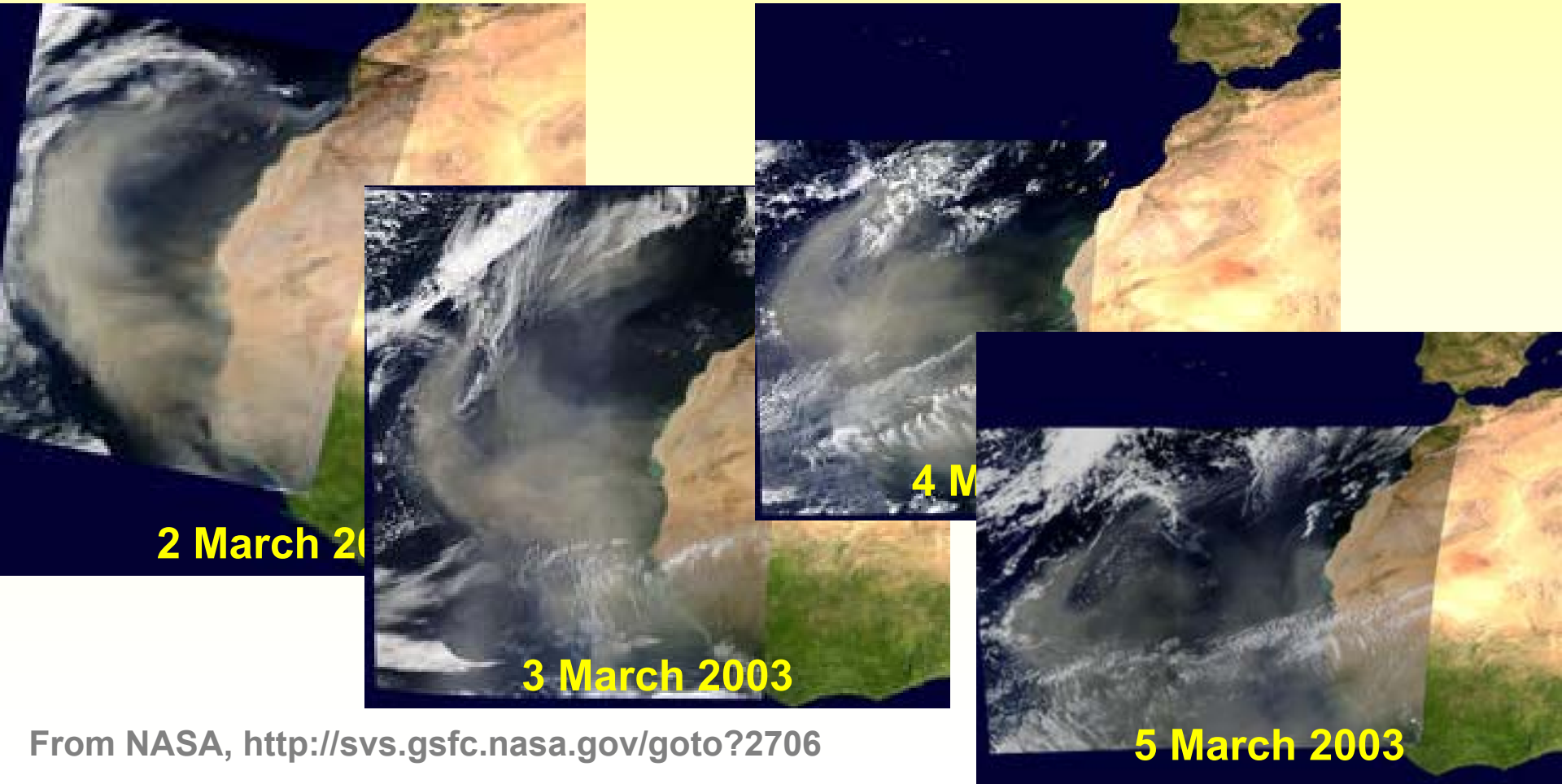
Air-borne dust derived from exposed soil surface

Dust storms derived from exposed soils in northern Africa

Air Quality

Air-borne dust derived from exposed soil surface

Dust storms derived from exposed soils in West Africa



From NASA, http://svs.gsfc.nasa.gov/goto?2706

Air Quality

Effect of tillage / soil residue cover on wind erosion

Susceptibility of soil to wind erosion

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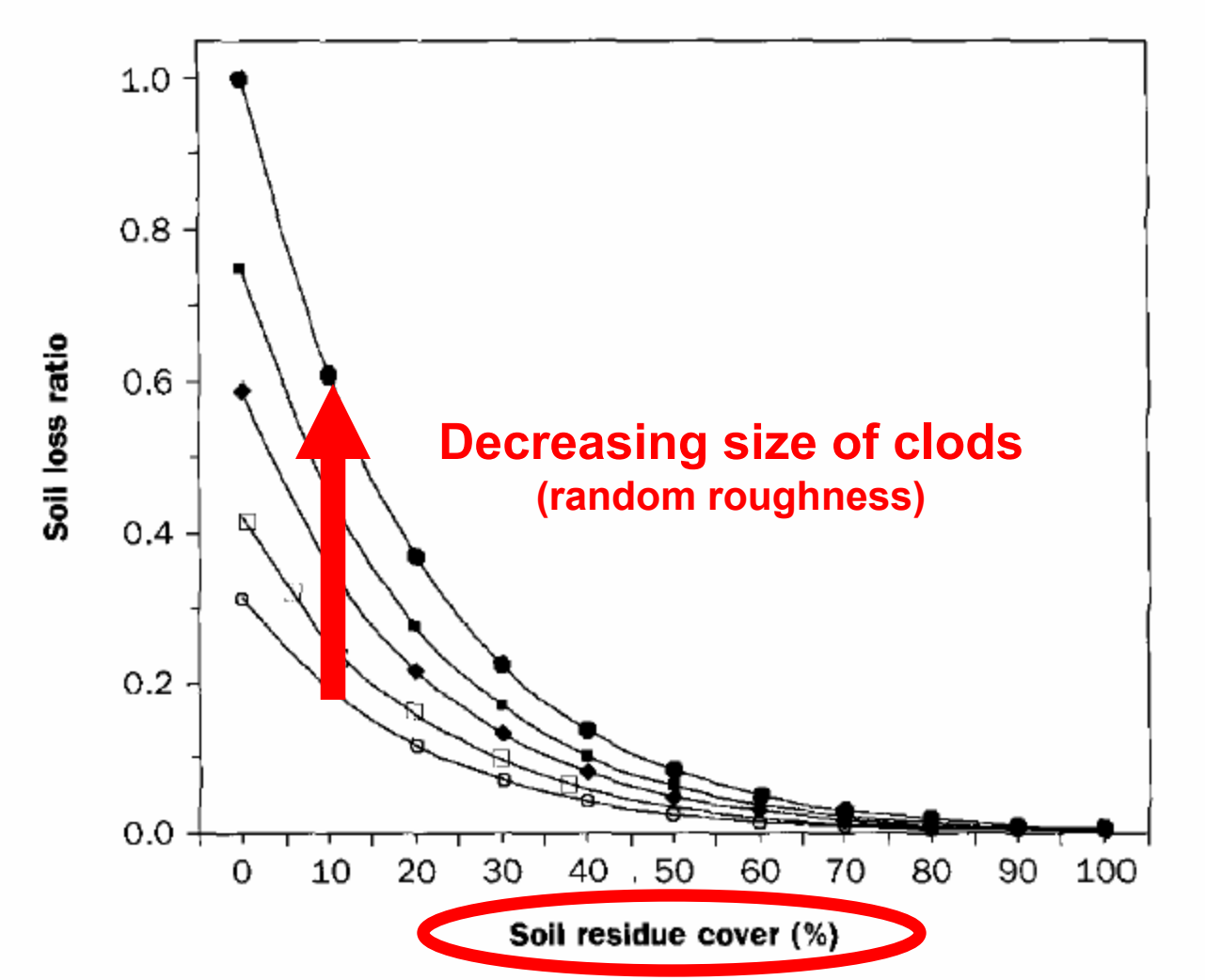
Greatest with

- **Low residue cover**
- **Low random roughness**



From Thorne et al. (2003) J. Soil Water Conserv. 58:250-257

Air Quality

Effect of crop residue removal

Soil	Years	Tillage	Wind-Erodible Aggregates (<1 mm, %) Straw removed	Straw retained	Source
Sandy Clay Loam Mollic Cryoboralf	4	Tilled	50	47	Malhi et al. (2006) Soil Tillage Res. 90:171-183
		No till	40	34	
Sandy Loam Typic Cryoboralf	5	Tilled	43	43	Malhi & Kutcher (2007) Soil Tillage Res. 94:353-361
		No till	33	30	
Clay Loam Mollic Cryoboralf	5	Tilled	27	28	
		No till	17	15	
Loam Udic Boroll	6	Tilled	39	33	Singh & Malhi (2006) Soil Tillage Res. 85:143-153
		No till	23	18	
Loam Mollic Cryoboralf	6	Tilled	46	42	
		No till	35	28	
Sandy Clay Loam Mollic Cryoboralf	8	Tilled	17	11	Malhi & Lemke (2007) Soil Tillage Res. 96:269-283
		No till	21	13	
Clay Loam Udic Boroll	9	Tilled	73	52	Singh et al. (1994) Soil Tillage Res. 32:117-133
Mean			**36**	**30**	**P < 0.01**

Air Quality

Greenhouse gas emissions

Ames IA

Bowen Ratio

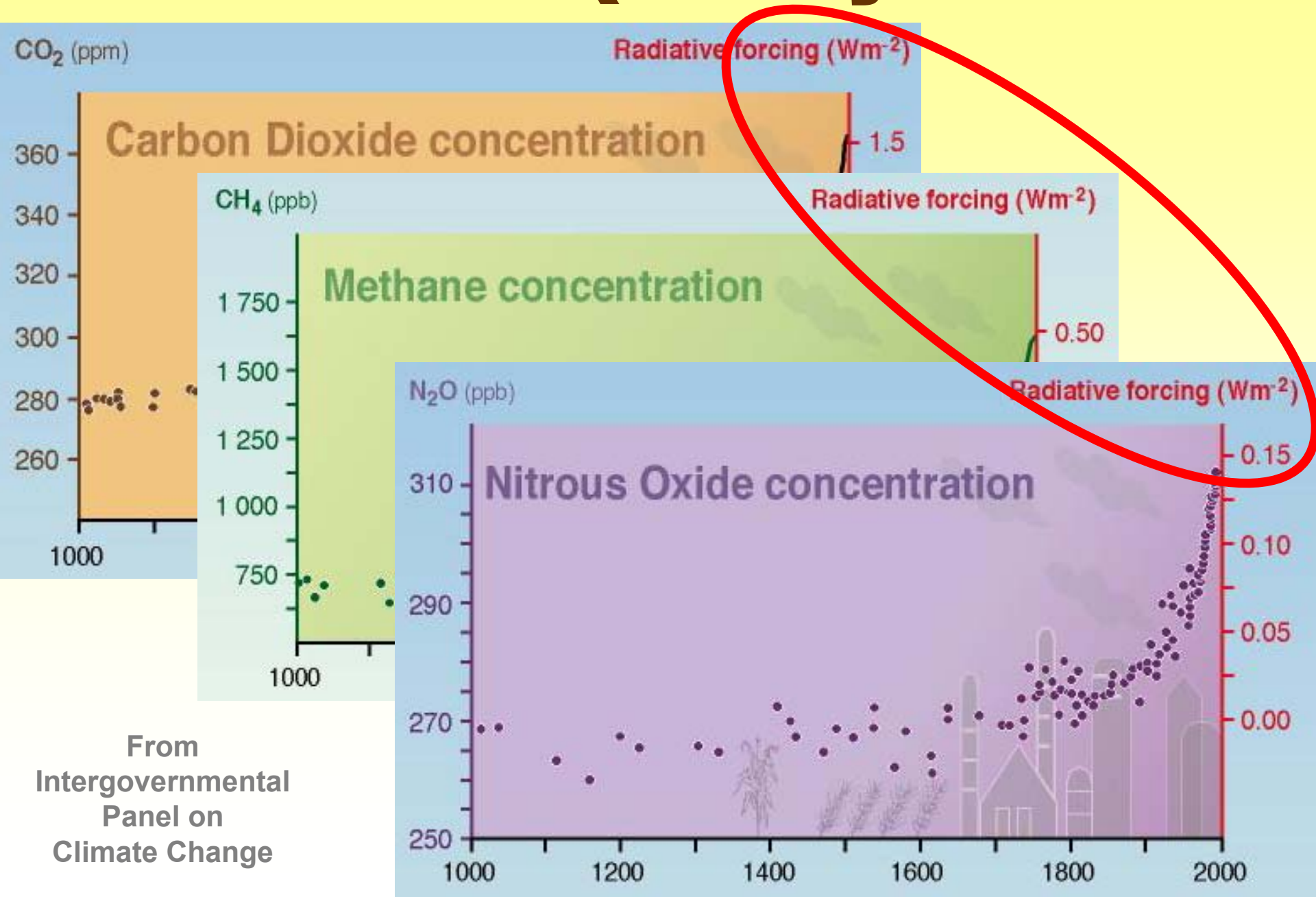
Bowling Green KY

Mandan ND

Fort Collins CO

Brookings SD

Air Quality



From Intergovernmental Panel on Climate Change

Air Quality

Summary

- ✓ **Conservation agricultural systems** can help to reduce air quality concerns with agriculture by protecting the soil surface from erosive winds that transport dust
- ✓ **Research – extension – education activities** are needed to demonstrate the advantages and disadvantages of system-wide management approaches to complex natural resource issues
  - On-going research on the mechanisms of soil and air quality deterioration / improvement must continue
- ✓ **Mitigation of greenhouse gas emissions** with conservation management approaches will reduce the threat of global change and improve the quality of our soil and air resources