Farming and Mitigation: selected strategies in the italian research agenda

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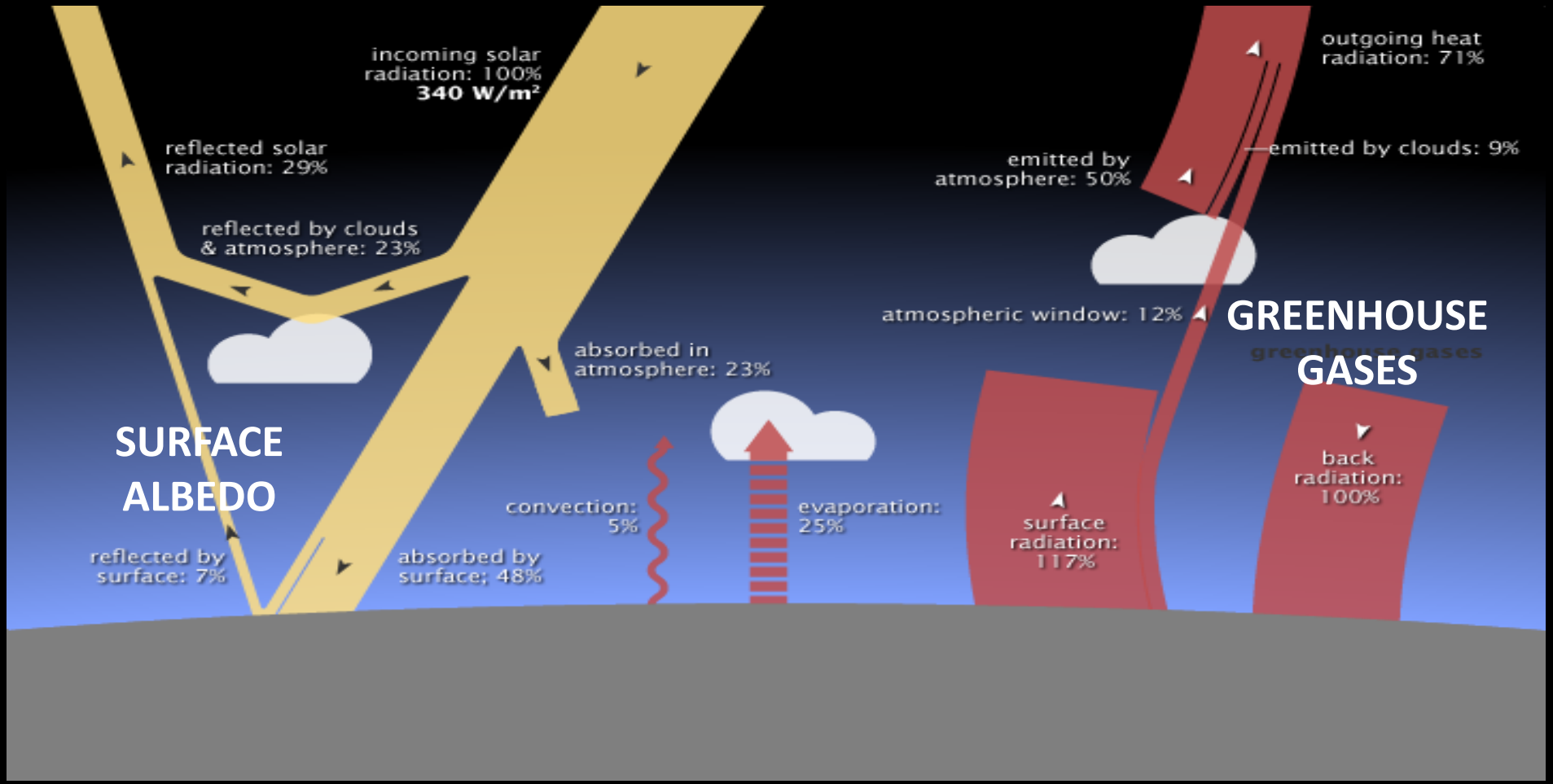
PLANETARY ENERGY BALANCE



1. BIOCHAR

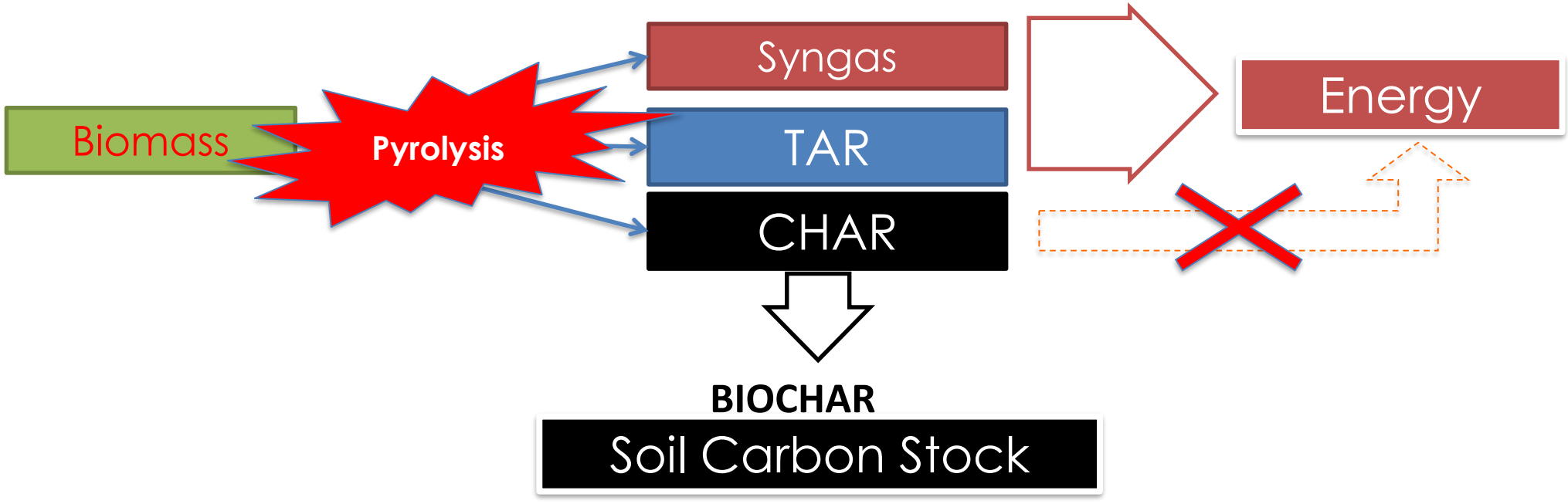
2. CONSERVATION AGRICULTURE

3.CHEESE SUPPLY CHAINS

4.HIGHLY REFLECTIVE CROPS

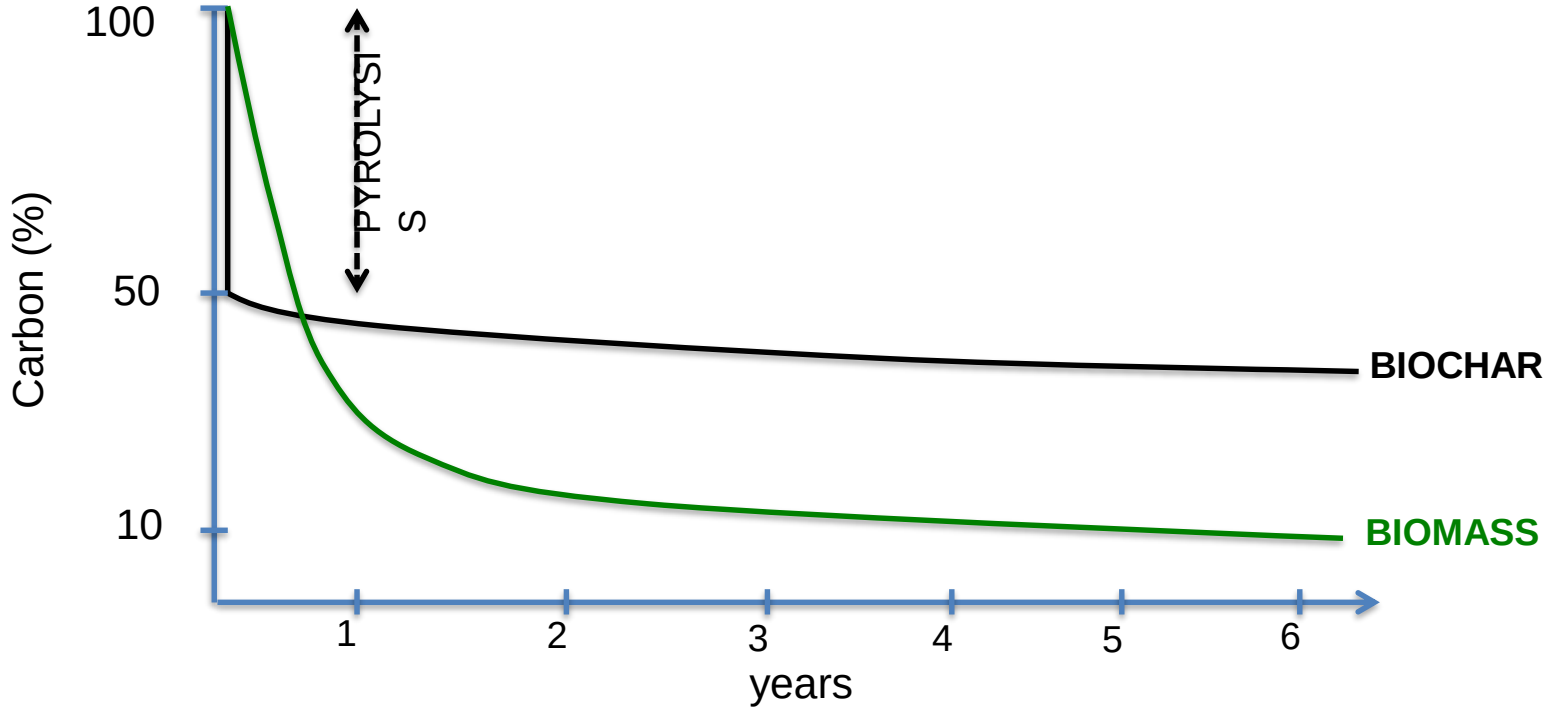
1. BIOCHAR

Pyrolysis process



Modification of the Carbon Cycle!!!

Stability of char in soils

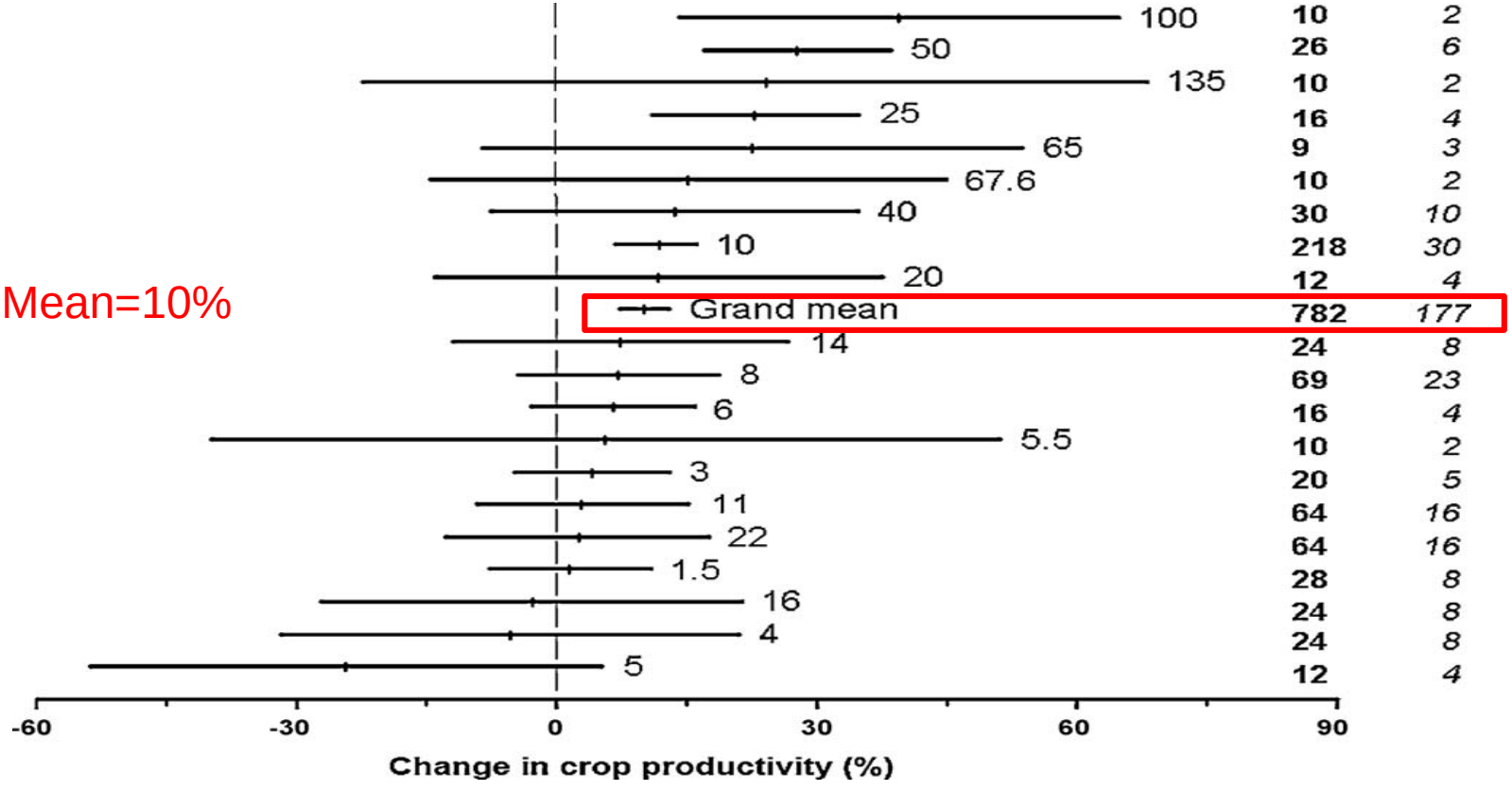


Biochar has high content of stable carbon, typically 50–85%, which resists decaying and remains in soils for long time

(Hammond et al., 2011)

The bright side

Mean=10%



Jeffery, 2011

The dark side

Potential drawbacks

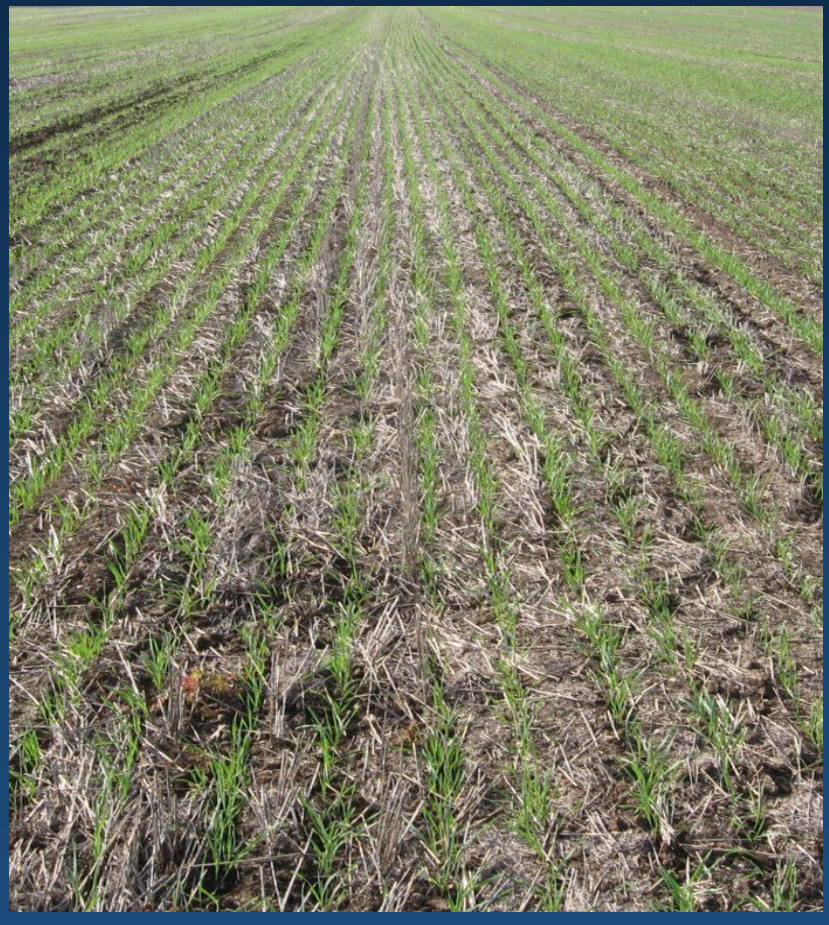
Surface Albedo

Black Carbon

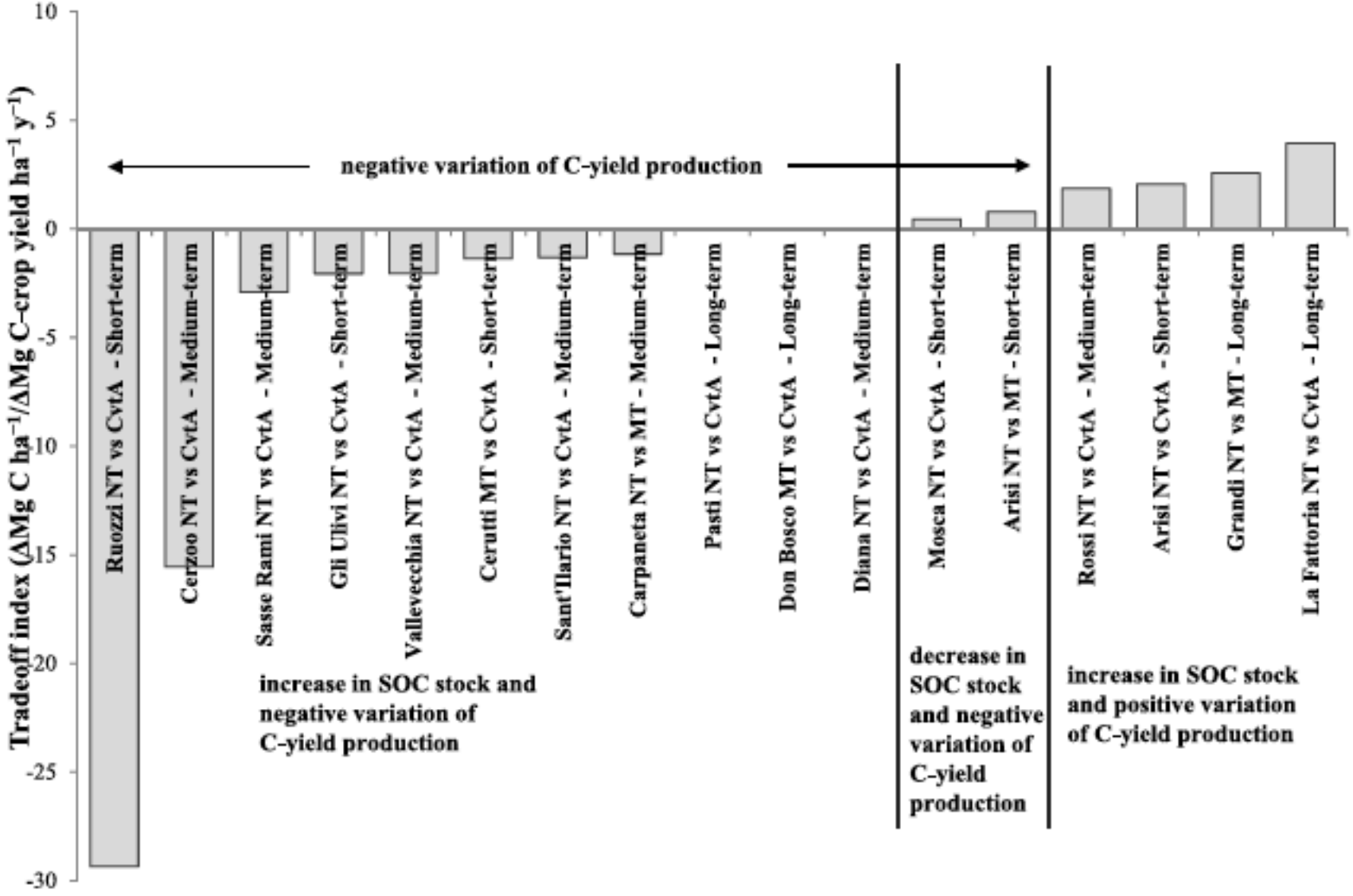
- **Traceability of biomass**
- **Land use**

Biochar certification

Guidelines and legislation



2. CONSERVATION AGRICULTURE


Tradeoff index (ΔMg C ha⁻¹/ΔMg C–crop yield ha⁻¹ y⁻¹)
10
5
0
-5
-10
-15
-20
-25
-30
negative variation of C-yield production
Ruozzi NT vs CvtA - Short-term
Cerzoo NT vs CvtA - Medium-term
Sasse Rami NT vs CvtA - Medium-term
Gli Ulivi NT vs CvtA - Short-term
Valleverchia NT vs CvtA - Medium-term
Cerutti MT vs CvtA - Short-term
Sant'Ilario NT vs CvtA - Medium-term
Carpaneta NT vs MT - Medium-term
Pasti NT vs CvtA - Long-term
Don Bosco MT vs CvtA - Long-term
Diana NT vs CvtA - Medium-term
Mosca NT vs CvtA - Short-term
Arisi NT vs MT - Short-term
Rossi NT vs CvtA - Medium-term
Arisi NT vs CvtA - Short-term
Grandi NT vs MT - Long-term
La Fattoria NT vs CvtA - Long-term
increase in SOC stock and negative variation of C-yield production
decrease in SOC stock and negative variation of C-yield production
increase in SOC stock and positive variation of C-yield production

3. ALTERNATIVE CHEESE SUPPLY CHAINS

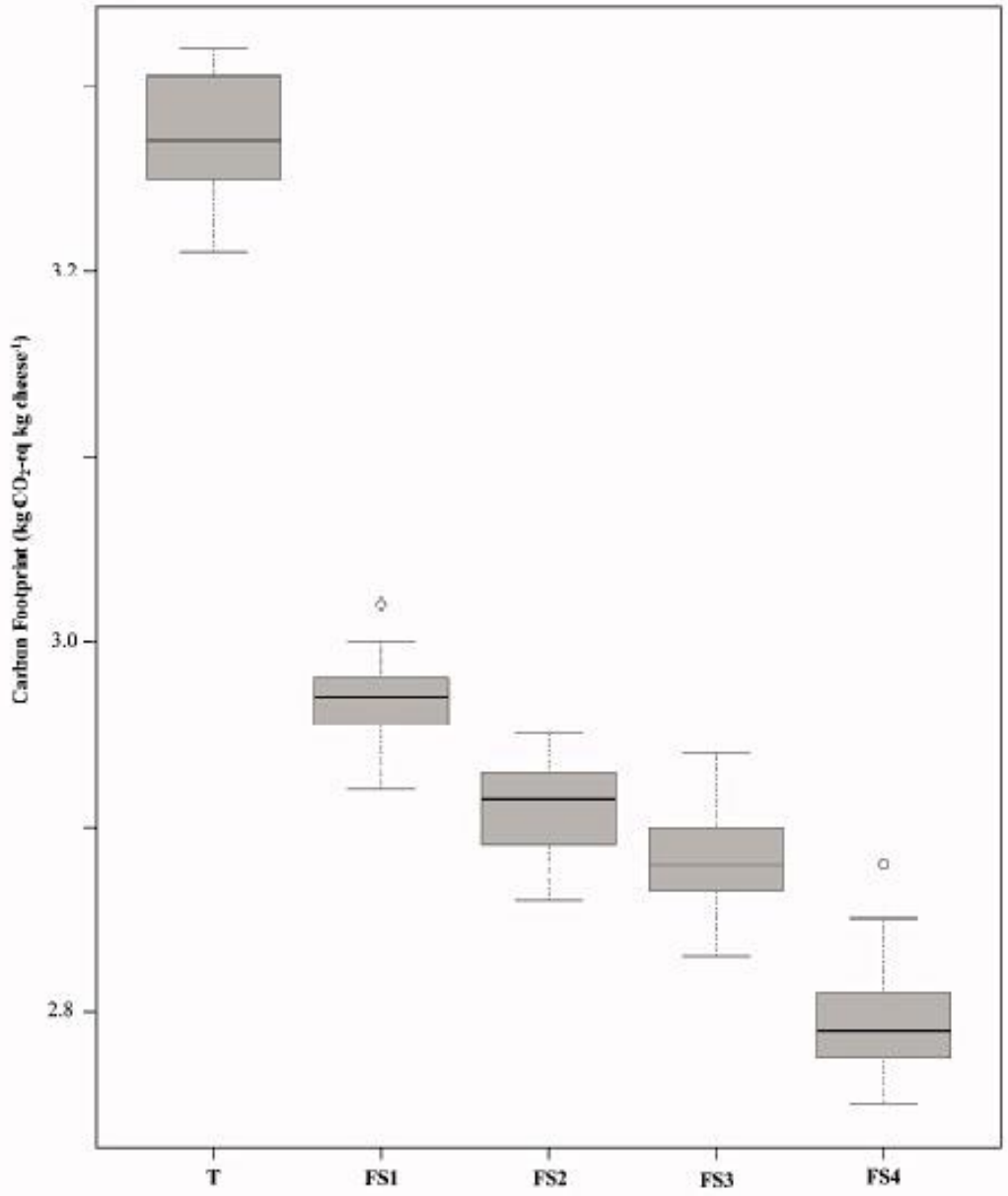
ELSEVIER

Journal of Cleaner Production
Volume 165, 1 November 2017, Pages 1078-1089

Environmental profile of Sardinian sheep milk cheese supply chain: A comparison between two contrasting dairy systems

Enrico Vagnoni [a], Antonello Franca [b], Claudio Porqueddu [b], Pierpaolo Duce [a]

	Actual and simulated scenarios				
Feed	T	FS1	FS2	FS3	FS4
Actual					
Soybean meal	0.125	0.125	-	-	-
Concentrate feed	0.100	0.100	0.100	0.100	-
Improved pasture	4	4.5	2.1	0.9	0.9
Introduced					
Sulla (*Hedysarum coronarium*) herbage	-	-	2.0	3.0	3.0
Oat grain	-	-	-	-	0.1



4. HIGHLY REFLECTIVE CROPS


2016-18

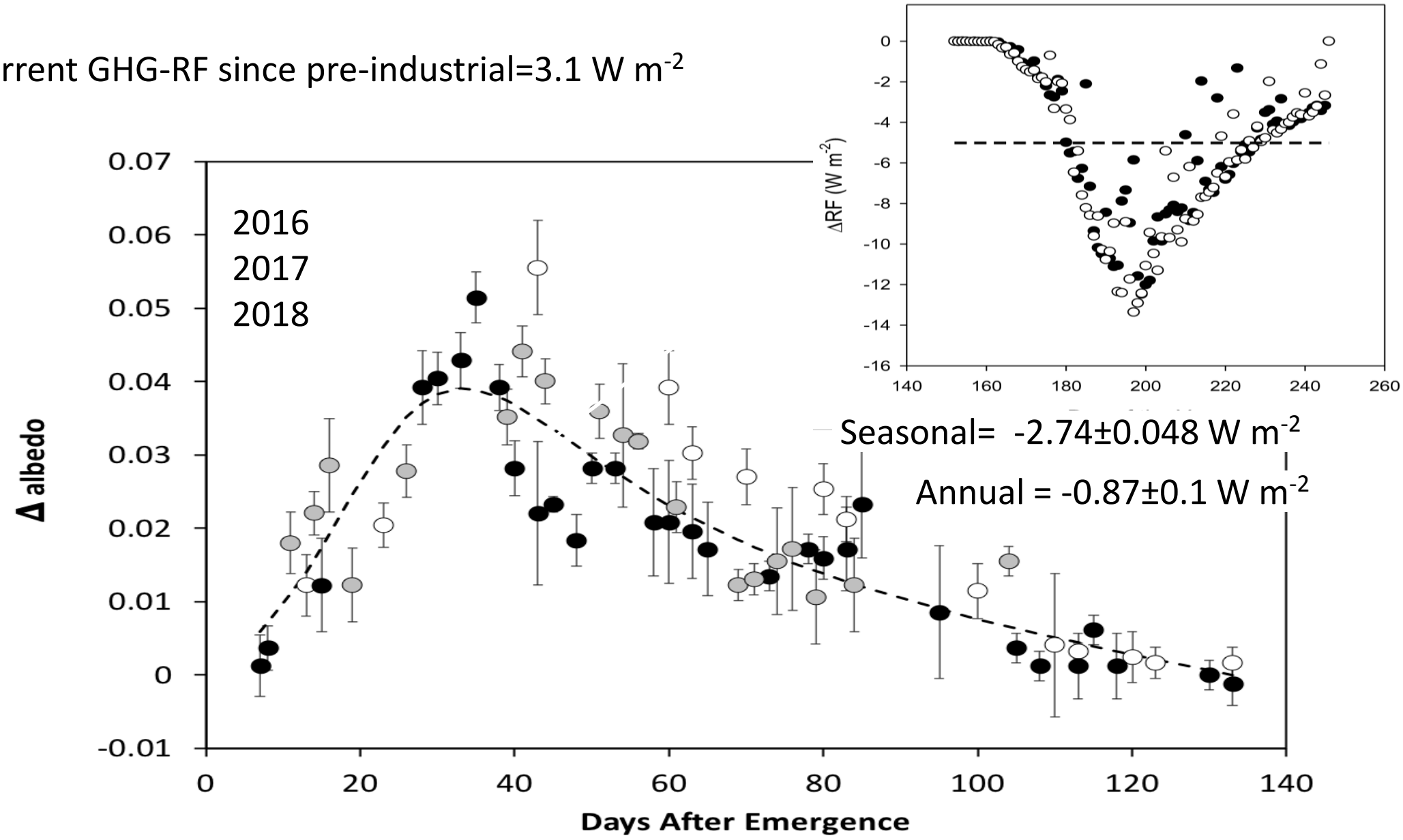

Bonn


Udine
07/07/2016 07:34


Firenze
2016


Foggia

Current GHG-RF since pre-industrial=3.1 W m^{-2}



$$\Delta\alpha(d) = \left(\frac{d}{GLS}\right)\frac{\left(\left(1+\left(\frac{d}{GSL}\right)^{k_3}\quad\left(1-\left(\frac{d}{GSL}\right)^{k_4}\right)\right)\right)}{\left(k_0+k_1\left(\frac{d}{GSL}\right)+k_2\left(\frac{d}{GSL}\right)^2\right)}$$

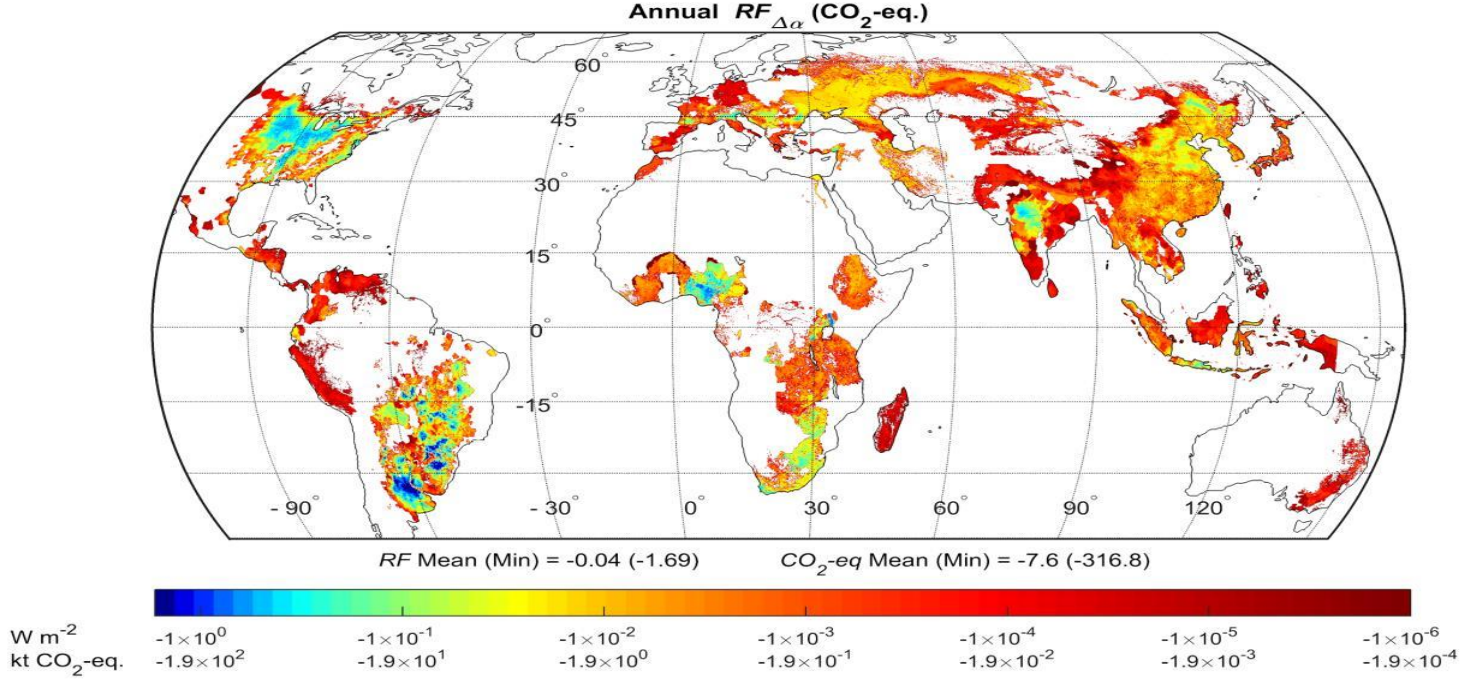
-0.04 W m-2

$$RF_{p,SW} = 100\left[365^{-1}\sum_{d=1}^{365} K_{p,d,\Delta\alpha}^{CAM5}\Delta\alpha_{p,d}\right]\frac{A_{p,Soy}}{A_p}$$

$$RF_{p,SW}^{Global} = 100\left[365^{-1}\sum_{d=1}^{365} K_{p,d,\Delta\alpha}^{CAM5}\Delta\alpha_{p,d}\right]\frac{A_{p,Soy}}{A_{Earth}}$$

Equal to 12% of the current annual increase in the global GHG-driven RF

corresponding to -4.4 Gt CO2-eq y-1



Thanks for your attention