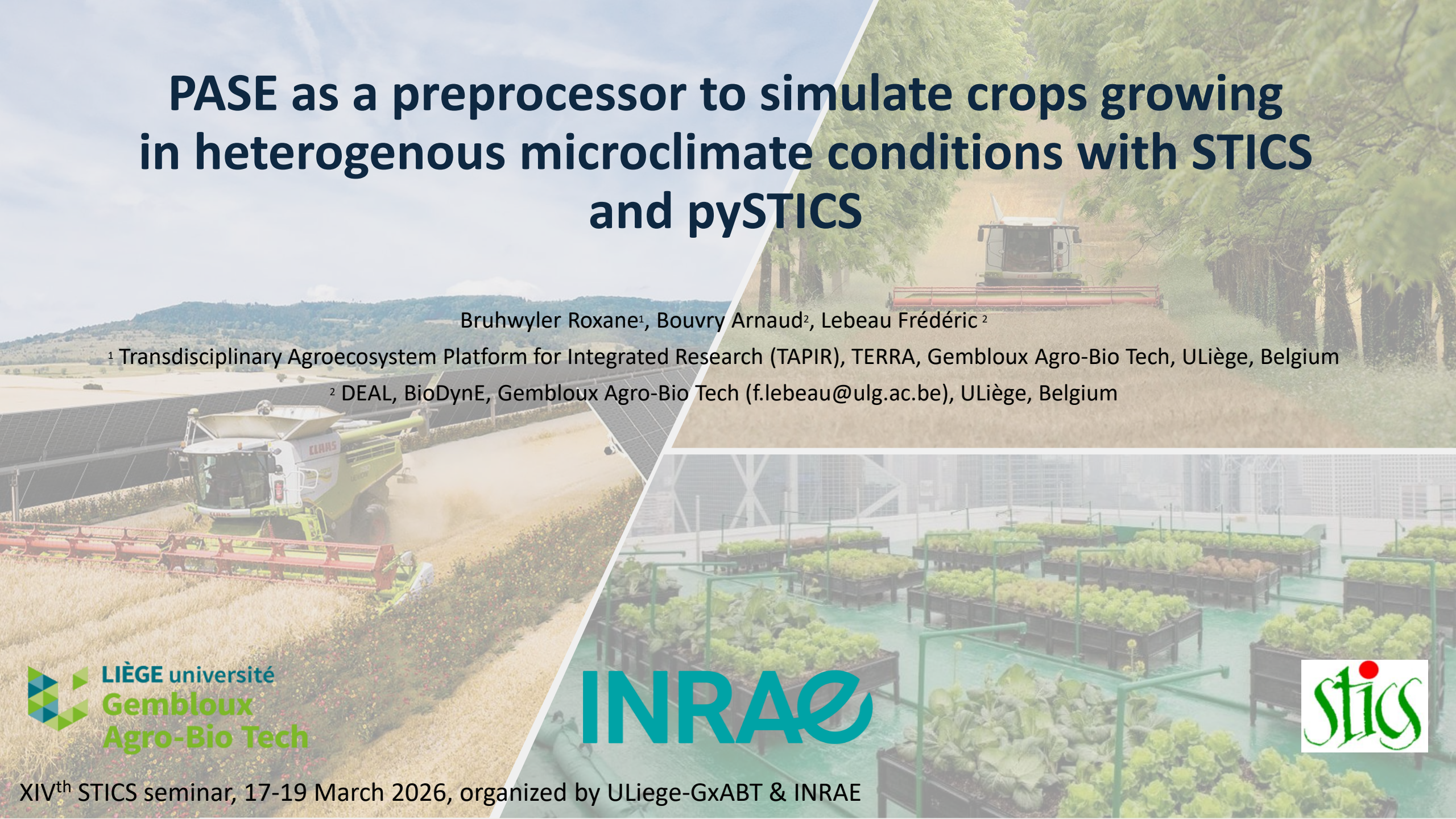
PASE as a preprocessor to simulate crops growing in heterogenous microclimate conditions with STICS and pySTICS

Bruhwyler Roxane[1], Bouvry Arnaud[2], Lebeau Frédéric [2]

[1] Transdisciplinary Agroecosystem Platform for Integrated Research (TAPIR), TERRA, Gembloux Agro-Bio Tech, ULiège, Belgium

[2] DEAL, BioDynE, Gembloux Agro-Bio Tech (f.lebeau@ulg.ac.be), ULiège, Belgium



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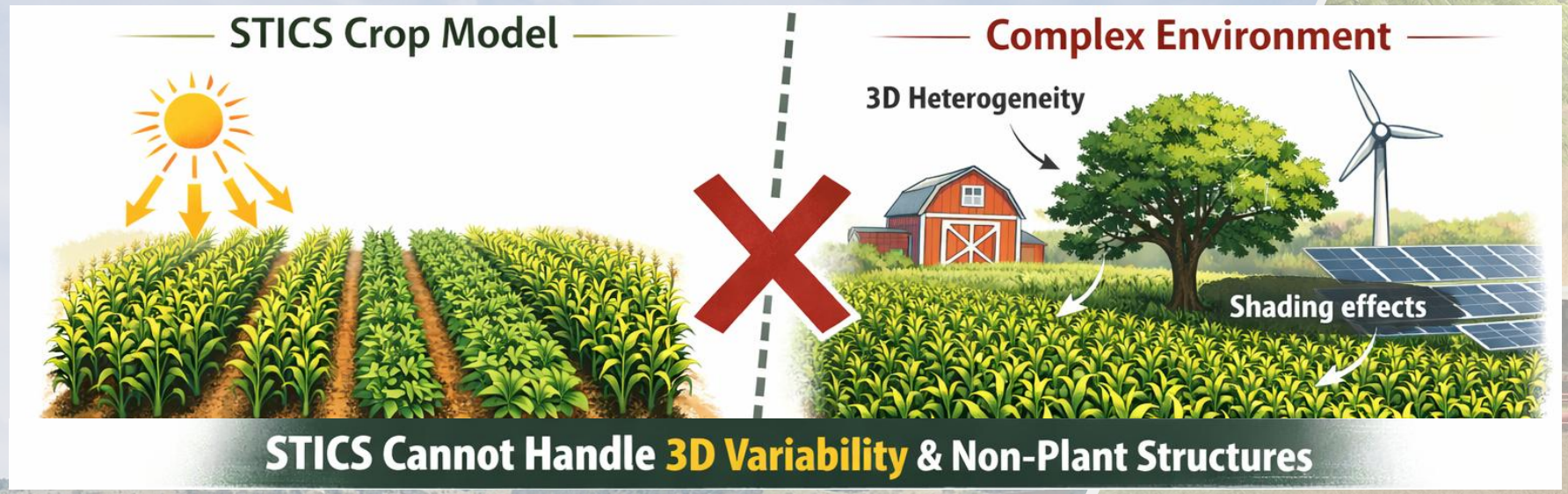

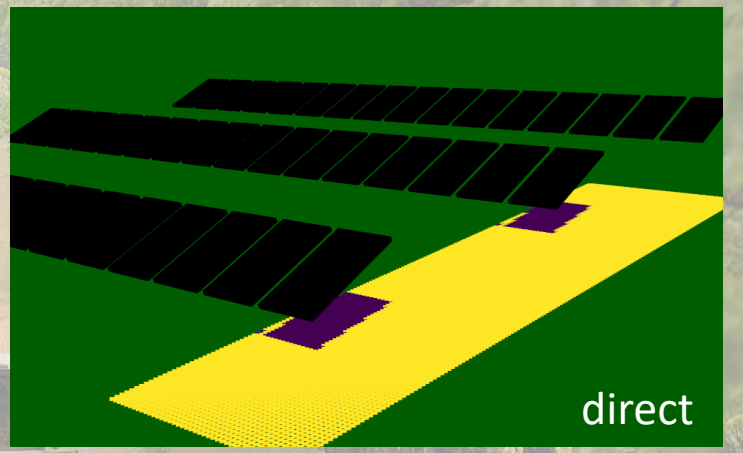

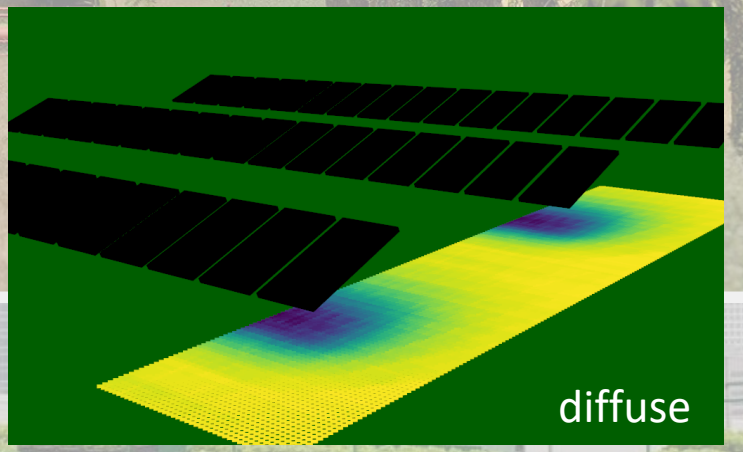

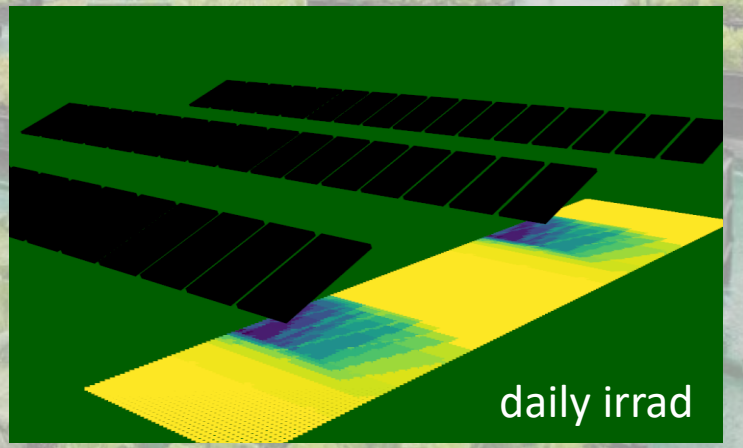

Feedback loop

AV system configuration

PV plant geometry
- i - Geometric parameters of PV modules, PV blocks and PV plant
- i - Location and type of structures

Other objects in the scene
- i - Location and geometry
- i - Topography

Microclimate models

i- Weather data (hourly or higher resolution)

> Light module
- i - Sun positions (same resolution as weather data)
- m- Erbs et al. correlation: DHI from GHI

Irradiance on PV modules
- m- HDKR model: GPOA calculation (non isotropic sky)
  OR
- m- Ray casting algorithm (isotropic sky *OR aniso*tropic sky)

Irradiance on crop
- i - Area of interest
- m- Ray casting algorithm (isotropic sky OR anisotropic sky)

> Wind module

Vertical AV
- m- Hedge windbreak model of Campi et al (2011)

> Rain module

PV production models

Energy yield over the simulation period
- i - Technical data of PV modules and plant
- i - Weather data (hourly or higher resolution)
- m- Efficiency, thermal losses, shade factor, electrical losses

Crop models

Yield & agronomic indicators along cropping seasons
- i - Soil, crop, management and modelling parameters
- i - Daily weather data
  OR higher resolution
- m- SIMPLE
  OR
- m- STICS
  OR
- m- Gras-Sim
  OR
- m- pySTICS *(some process refined for AV)*
  OR
- *m- CPlantBox*

Example output