

## Regional variation in the effectiveness of methane-based and land-based climate mitigation options

We use a number of python scripts to process the IMOGEN-JULES ensemble outputs and in some scripts to optimise the land-based mitigation options. The figure and table numbers refer to those in the published paper in Earth System Dynamics.

### Post-processing scripts

#### 1. MITIGATION\_Paper\_BECCS\_Sensitivity\_RRv1.5.py

Calculation of (a) required BECCS scale factor ( $\kappa$ ) for BECCS to equal the “natural” carbon uptake and (b) variation of the carbon uptake with the BECCS scale factor ( $\kappa$ ). Used to generate:

- Figure 7: Required BECCS scale factor
- Figure 10: Composite figure on BECCS

#### 2. MITIGATION\_Paper\_MITIGATIONOptions\_synthesis\_RRv1.4.py

Optimisation of the land-based mitigation options for a specified BECCS scale factor.

Used to generate:

- Figure 8: Carbon pools
- Figure 9: AFFEB and mitigation potentials
- Figure 12: Regional breakdown for 1.5° C of warming
- Supplementary Information, Figure SI.3: Regional breakdown for 2° C of warming

Used to provide input data for Figure 11 and Supplementary Information, Figure SI.4 (see 7 below)

#### 3. MITIGATION\_Paper\_BECCS\_WaterDemand\_RRv1.2.py

Derivation of water availability and demand. Used to generate:

- Figure 13: Water availability
- Figure 14: Water demand for IMAGE regions with significant BECCS deployment

### Post-processing scripts for figures and tables

#### 4. MITIGATION\_Paper\_Profiles\_T\_CH4\_CO2\_RRv1.4.py

Profiles

- Figure 3: Temperature pathways and time evolution of radiative forcing
- Figure 6: Time evolution of carbon dioxide and methane

#### 5. MITIGATION\_Paper\_Regions\_plot\_CH4\_emissions.py

Time series of methane emissions

- Figures 4: selected IMAGE IAM regions
- Supplementary Information, Figure SI.1: All IMAGE IAM regions

#### 6. MITIGATION\_Paper\_LandCover\_RRv1.3.py

Time series of land use (as trees, agriculture, bioenergy, grasses and shrubs)

- Figures 5: IMAGE Russia and Brazil regions
- Supplementary Information, Figure SI.2: All IMAGE IAM regions

#### 7. MITIGATION\_Paper\_Map\_v5.py

Map showing IMAGE IAM regions and the contribution of different mitigation options

- Figure 11
- Supplementary Information, Figure SI.4

8. MITIGATION\_Paper\_BECCS\_Extra\_RRv1.2.py

Additional information on BECCS deployment and yields

- Supplementary Information, Table SI.4