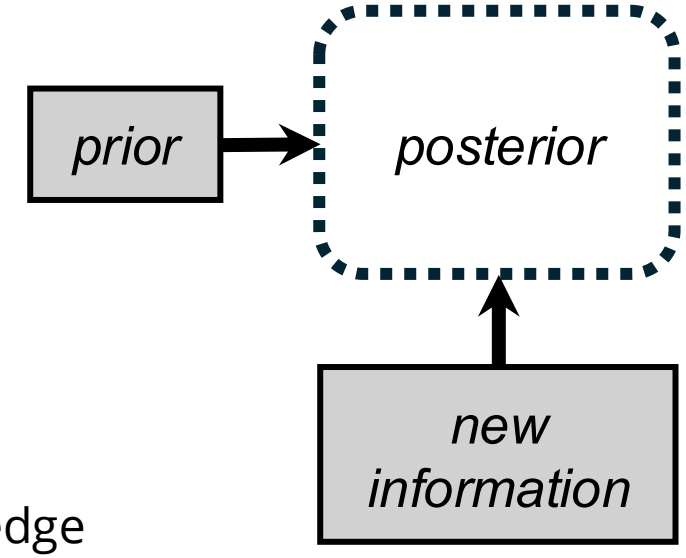
# Updating Framework

Old Knowledge + New Info = Updated Knowledge

This presentation participates in OSPP
EGU
Outstanding Student & PhD candidate Presentation contest
Sharing is encouraged

## Updating Framework

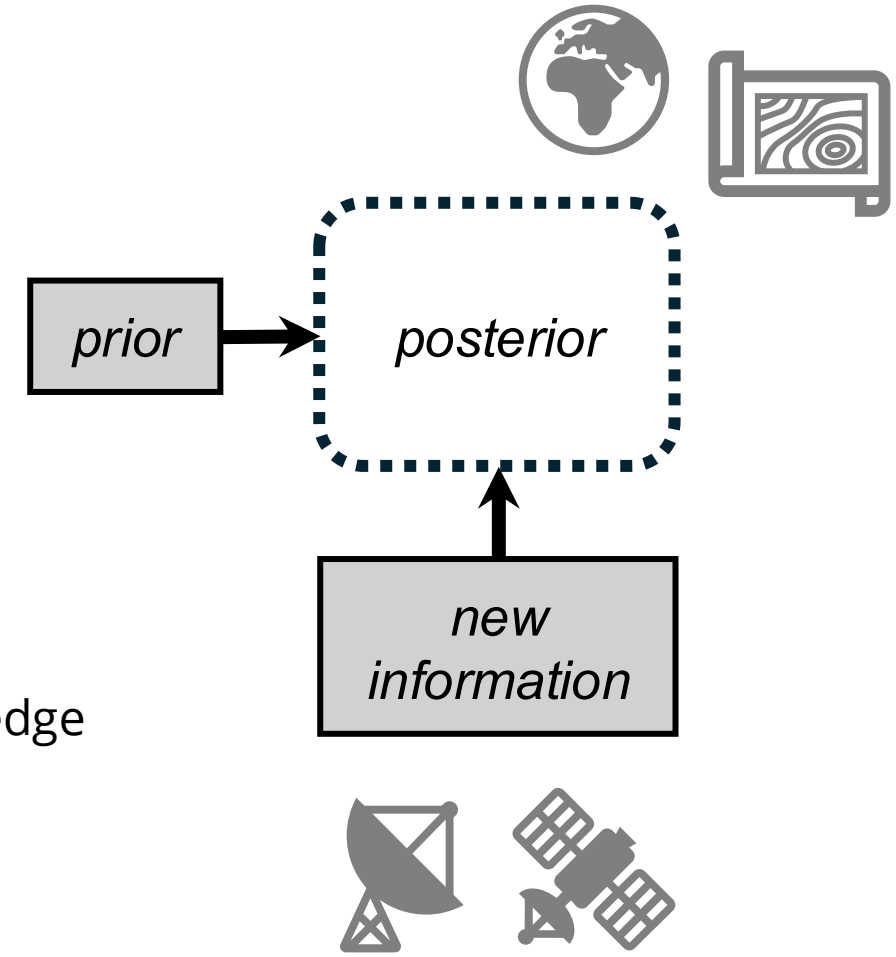
Old Knowledge + New Info = Updated Knowledge




This presentation participates in OSPP
EGU
Outstanding Student & PhD candidate Presentation contest
Sharing is encouraged



**Local Census Data**
**Experts' Belief System**




## Updating Framework

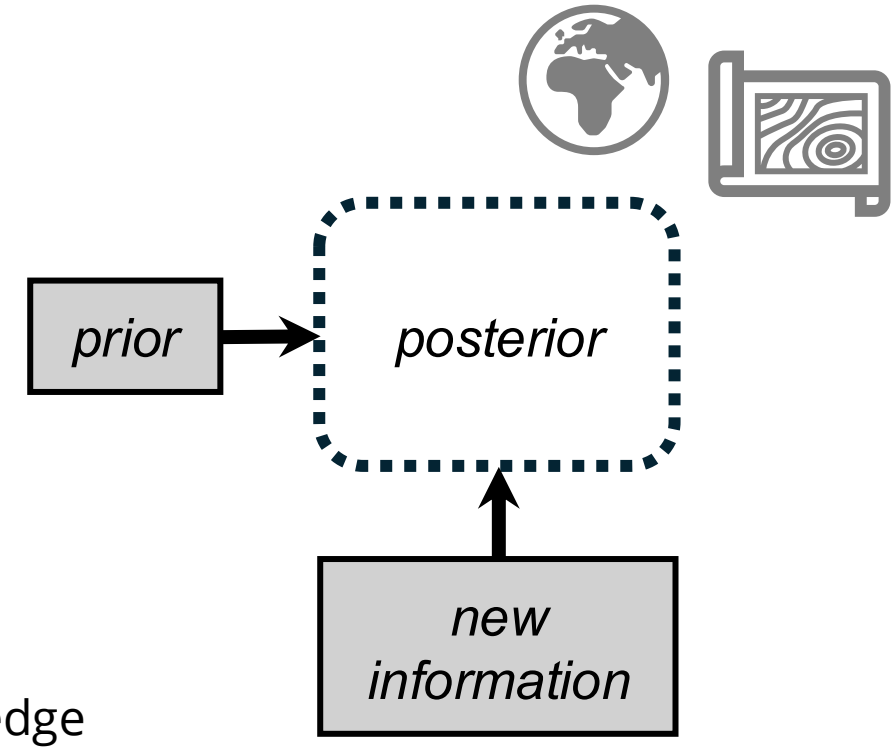
Old Knowledge + New Info = Updated Knowledge

This presentation participates in OSPP
EGU
Outstanding Student & PhD candidate Presentation contest
Sharing is encouraged

This presentation participates in OSPP
EGU
Outstanding Student & PhD candidate Presentation contest
Sharing is encouraged



**Local Census Data**
**Experts' Belief System**




## Updating Framework

Old Knowledge + New Info = Updated Knowledge



**MODELLING EXPOSURE THROUGH EARTH OBSERVATION ROUTINES (METEOR)**

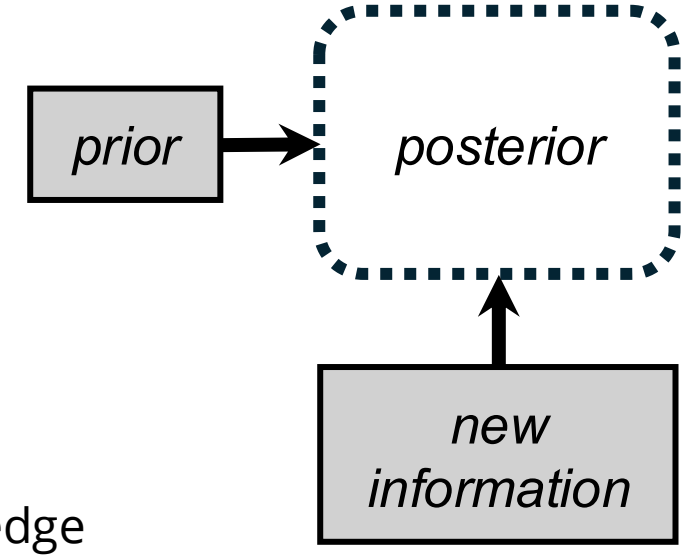
(Huyck et al., 2019; Winson et al. 2020)

This presentation participates in OSPP
EGU
Outstanding Student & PhD candidate Presentation contest
Sharing is encouraged



## Local Census Data
## Experts' Belief System



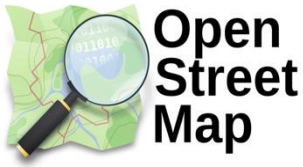




## Updating Framework

Old Knowledge + New Info = Updated Knowledge

GLOBAL DYNAMIC EXPOSURE AND THE OPENBUILDINGMAP

(Schorlemmer et al., 2020, 2026; Oostwegel et al., 2025)

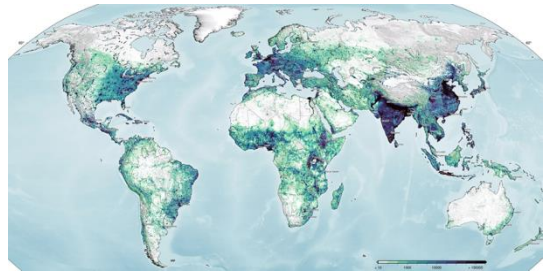


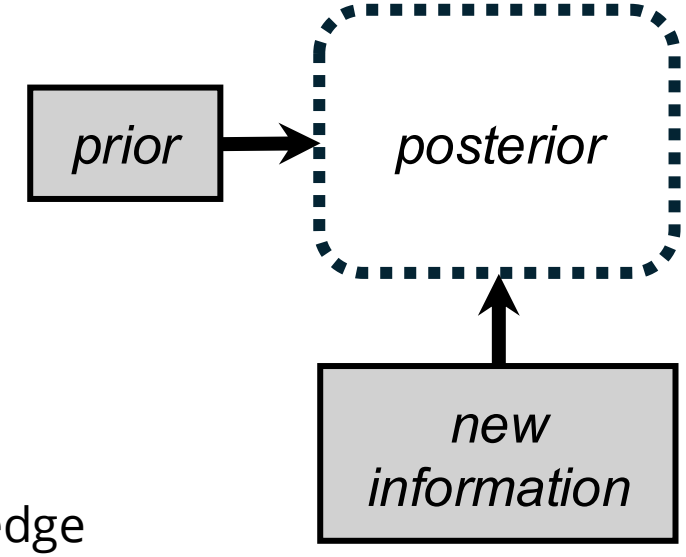

Google Open Building
Microsoft ML Building Footprints
GHSL Dataset

This presentation participates in OSPP
EGU
Outstanding Student & PhD candidate Presentation contest
Sharing is encouraged



**Local Census Data**
**Experts' Belief System**






## Updating Framework

Old Knowledge + New Info = Updated Knowledge

GEM
GLOBAL EARTHQUAKE MODEL
working together to assess risk



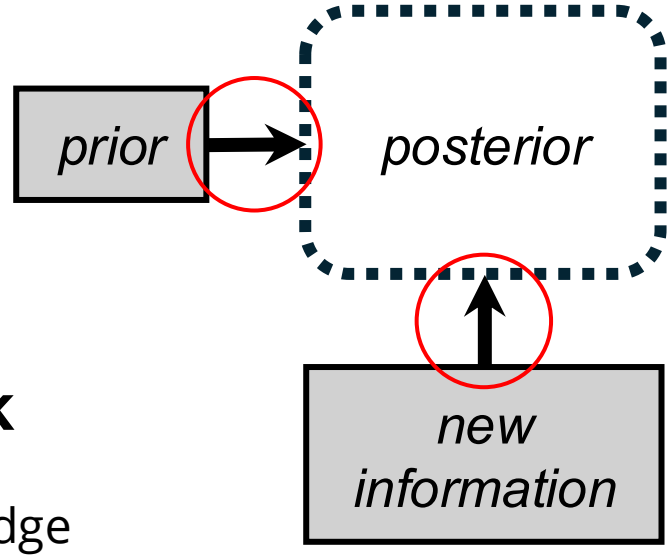

(Paul et al., 2022; Pittore et al., 2022; Porter et al. 2014)

Multinomial, parameterized by $\boldsymbol{\theta}$

$$p(\mathbf{n}|\boldsymbol{\theta}) = Mul(\mathbf{n}|\theta) = \frac{N!}{n_1! \cdots n_k!} \theta_1^{n_i} \cdots \theta_k^{n_k}$$

Binomial, parameterized by $\boldsymbol{p}$

$$P\left[Y_t \geq y \middle| N\right] = 1 - \sum_{m=0}^{y} {}_N C_m \cdot p^m \cdot (1-p)^{N-m}$$




## Bayesian Updating Framework

Old Knowledge + New Info = Updated Knowledge

GEM
GLOBAL EARTHQUAKE MODEL
working together to assess risk

(Pittore et al., 2022; Porter et al. 2014)

This presentation participates in OSPP
EGU
Outstanding Student & PhD candidate Presentation contest
Sharing is encouraged

This presentation participates in OSPP
EGU
Outstanding Student & PhD candidate Presentation contest
Sharing is encouraged



*$\boldsymbol{\theta}$ is deeply learned via neural nets, exploiting rich info from big data*

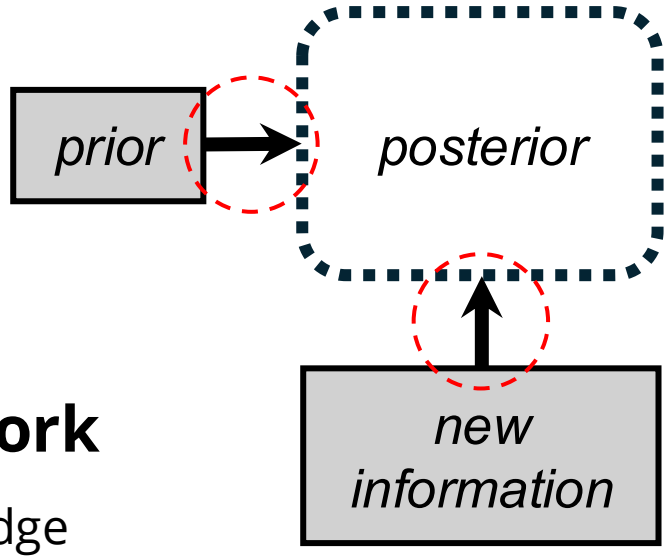


*spatiotemporal correlation is through graph representation*

Multinomial, parameterized by $\boldsymbol{\theta}$

$$p(\mathbf{n}|\boldsymbol{\theta}) = Mul(\mathbf{n}|\theta) = \frac{N!}{n_1! \cdots n_k!} \theta_1^{n_i} \cdots \theta_k^{n_k}$$

(Pittore et al., 2022)




# Deep Bayesian Updating Framework

Old Knowledge + New Info = Updated Knowledge

CURBE

UNIVERSITY OF CAMBRIDGE

(Dimasaka, Geiß, & So,, 2026)

This presentation participates in OSPP
EGU
Outstanding Student & PhD candidate Presentation contest
Sharing is encouraged

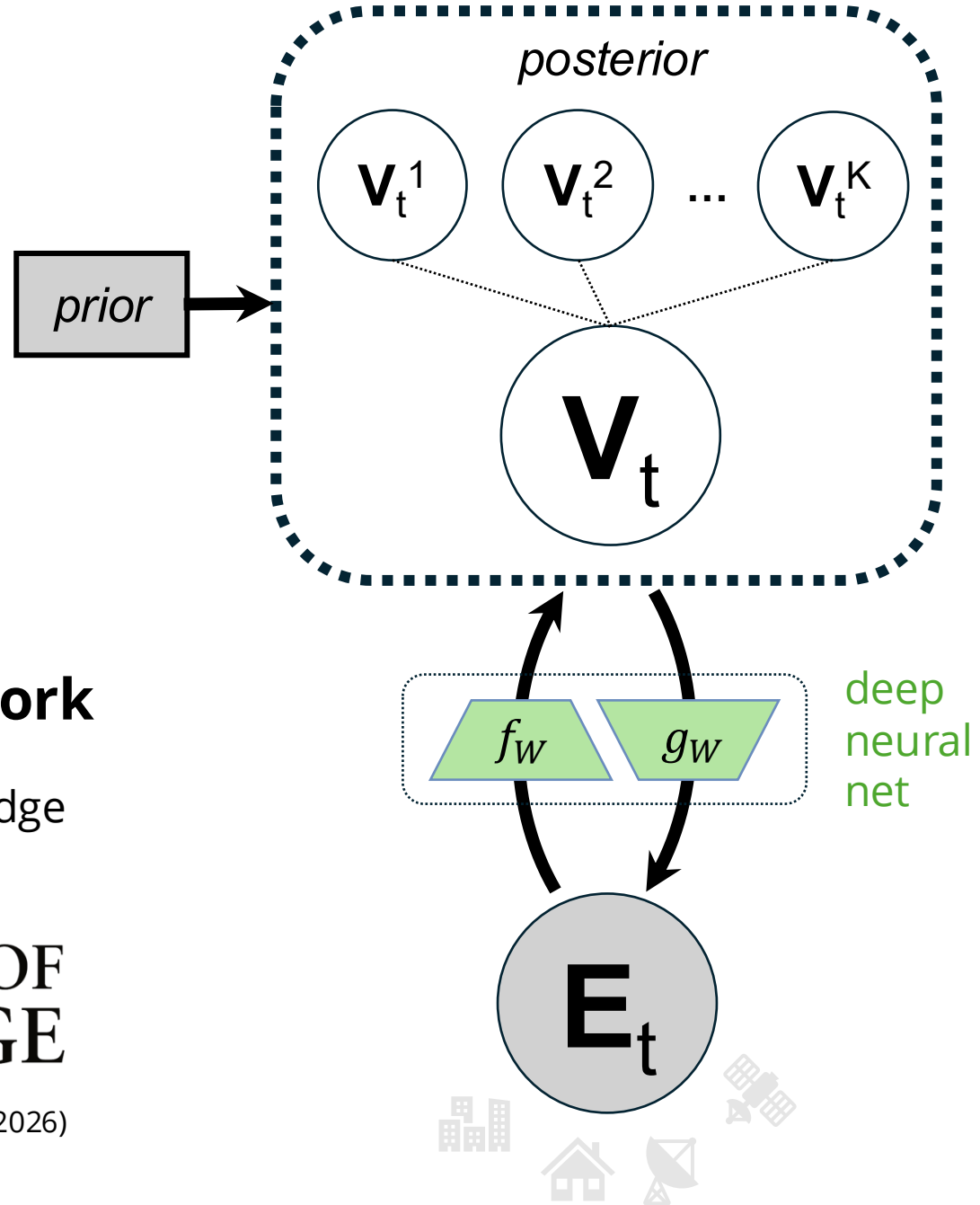
MODELLING EXPOSURE THROUGH EARTH OBSERVATION ROUTINES (METEOR)

GLOBAL DYNAMIC EXPOSURE AND THE OPENBUILDINGMAP

GEM GLOBAL EARTHQUAKE MODEL working together to assess risk

# Deep Bayesian Updating Framework

Old Knowledge + New Info = Updated Knowledge

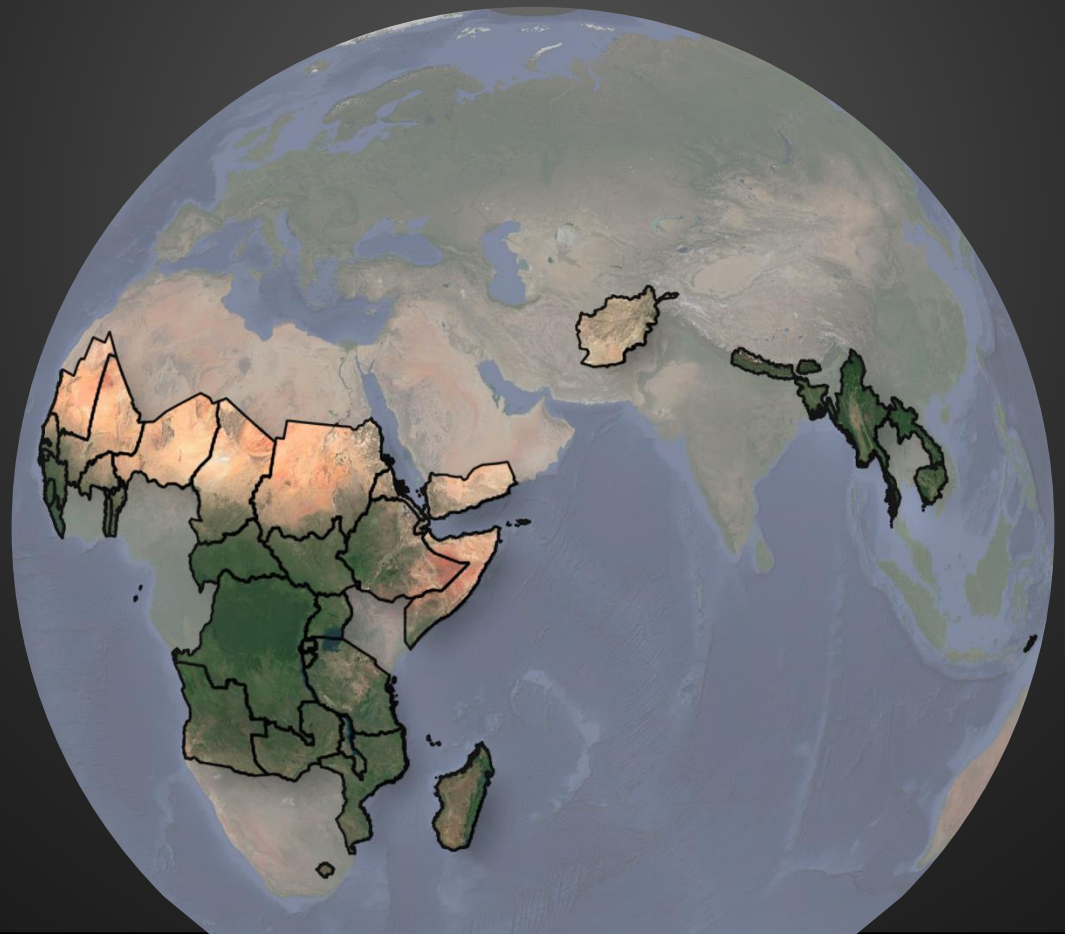



CURBE

UNIVERSITY OF CAMBRIDGE

(Dimasaka, Geiß, & So,, 2026)

# METEOR 2.5D: An Open Geospatial Dataset of the Spatiotemporal Evolution of Physical Vulnerability in UN-recognized Least Developed Countries (as of 2020) at Five-year Intervals, 1975-2030

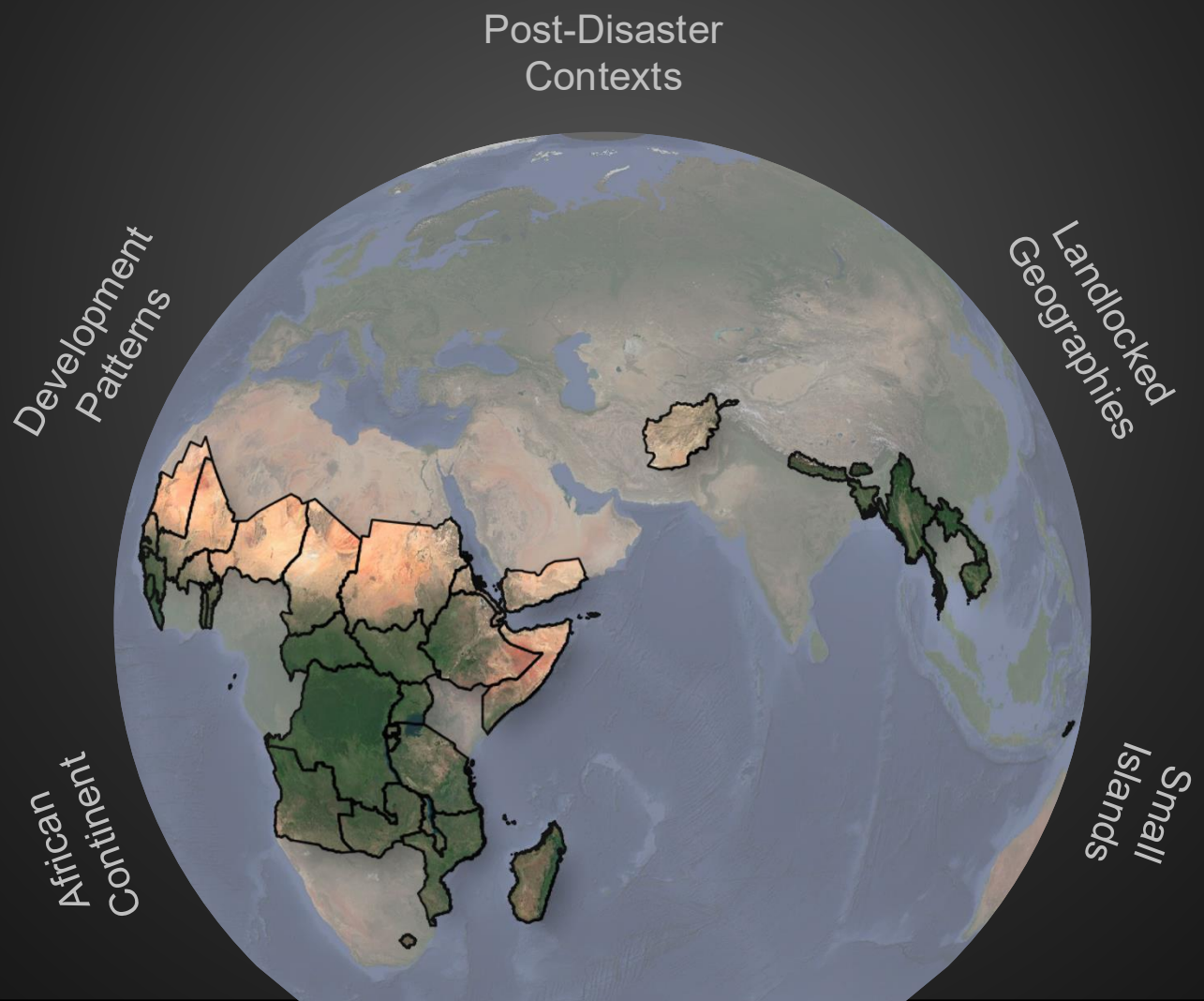


This presentation participates in OSPP
EGU
Outstanding Student & PhD candidate Presentation contest
Sharing is encouraged

Joshua **Dimasaka**
Christian **Geiß**
Emily **So**

UNIVERSITY OF CAMBRIDGE

# METEOR 2.5D: An Open Geospatial Dataset of the Spatiotemporal Evolution of Physical Vulnerability in UN-recognized Least Developed Countries (as of 2020) at Five-year Intervals, 1975-2030




This presentation participates in OSPP
EGU
Outstanding Student & PhD candidate Presentation contest
Sharing is encouraged