

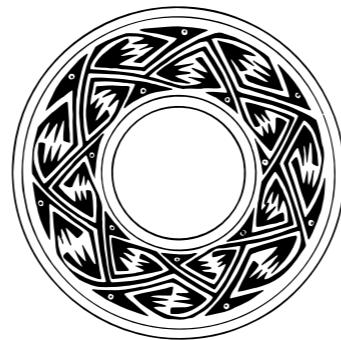
LARGE-SCALE BEHAVIORAL MODELS OF LAND USE CHANGE

Models, Tools, and Lessons

Kyle Bocinsky

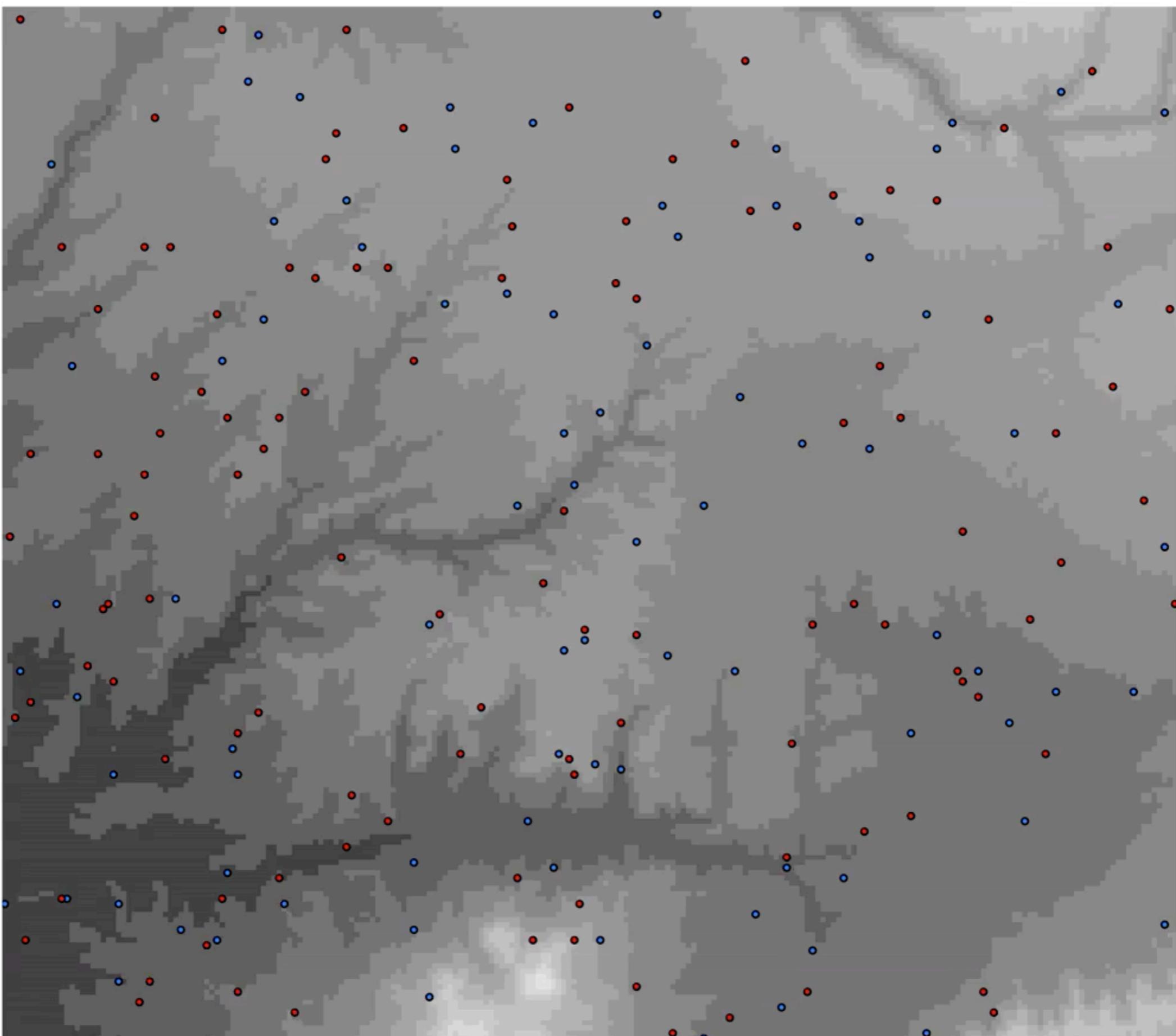


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Office**



THE
RESEARCH INSTITUTE AT
CROW CANYON





Run 1

600

Group Type (Preference)

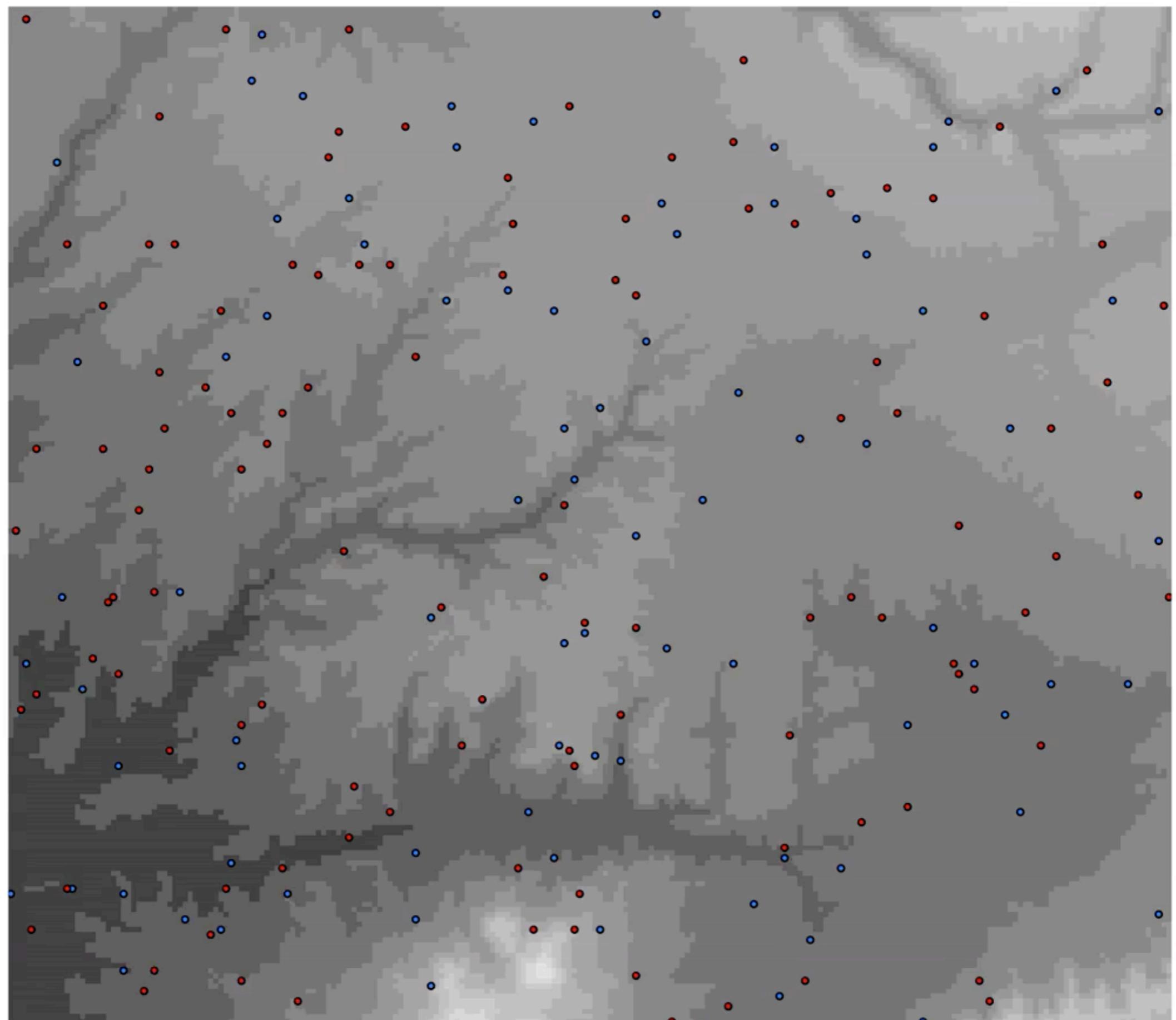
■ Non-hierarchical □ Hierarchical

Group Size (Households)

○ 1 ○ 25 ○ 50

Tribute Flow (kg of maize)

— 0 — 567

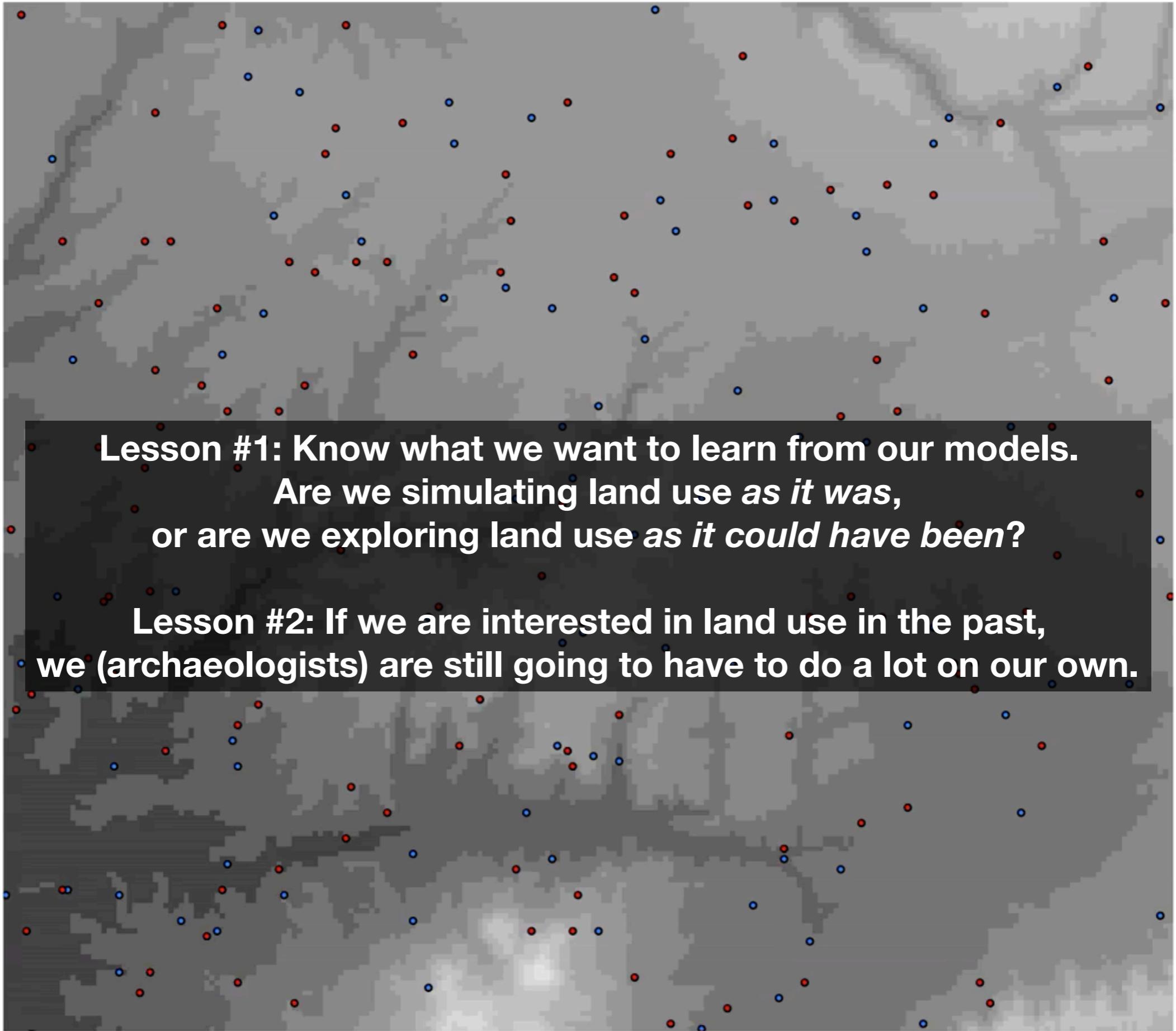


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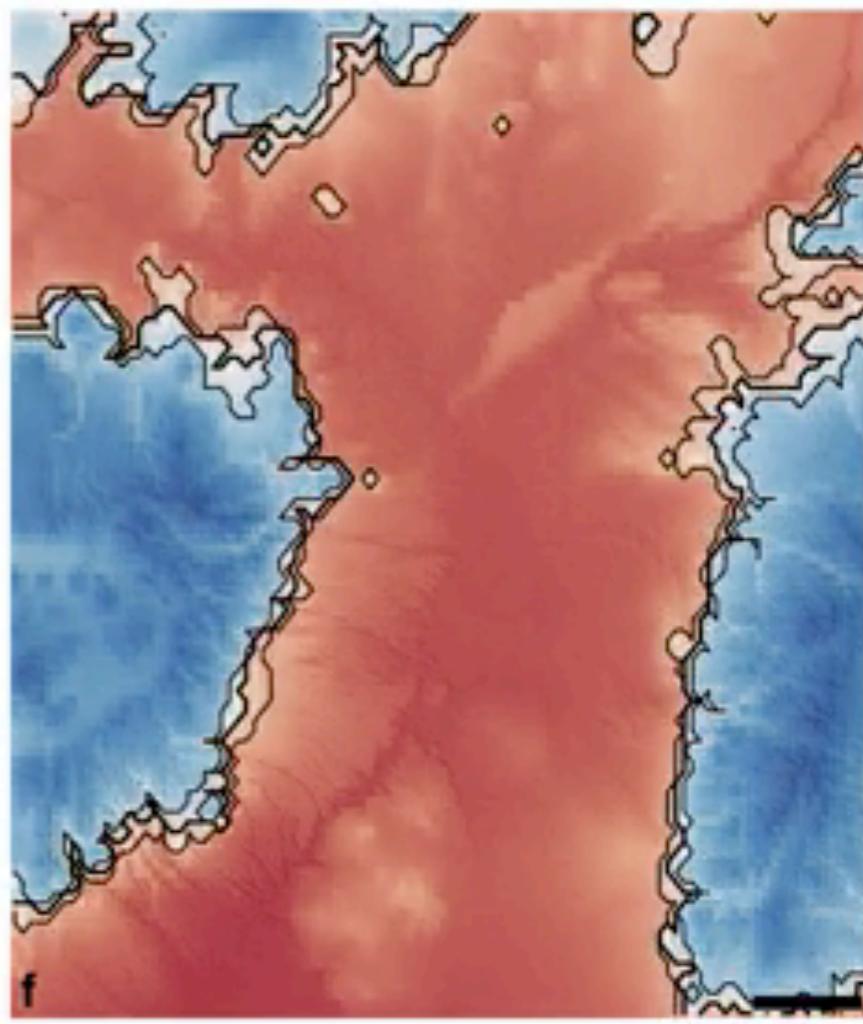
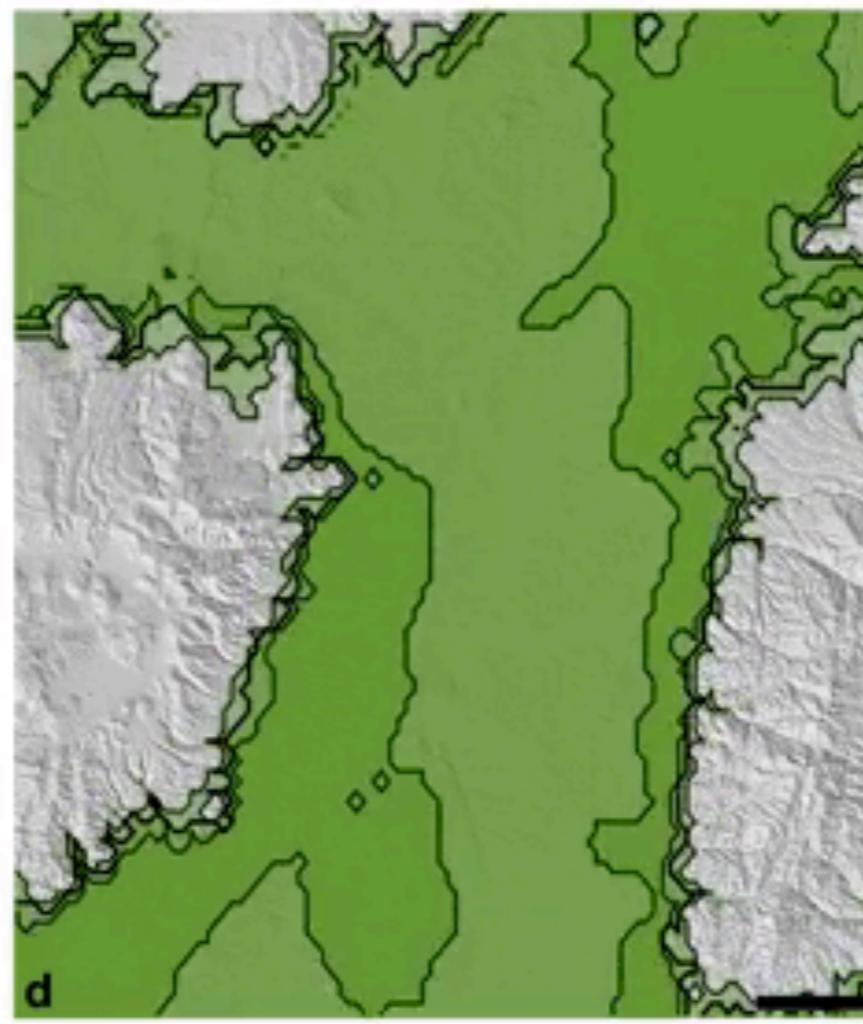
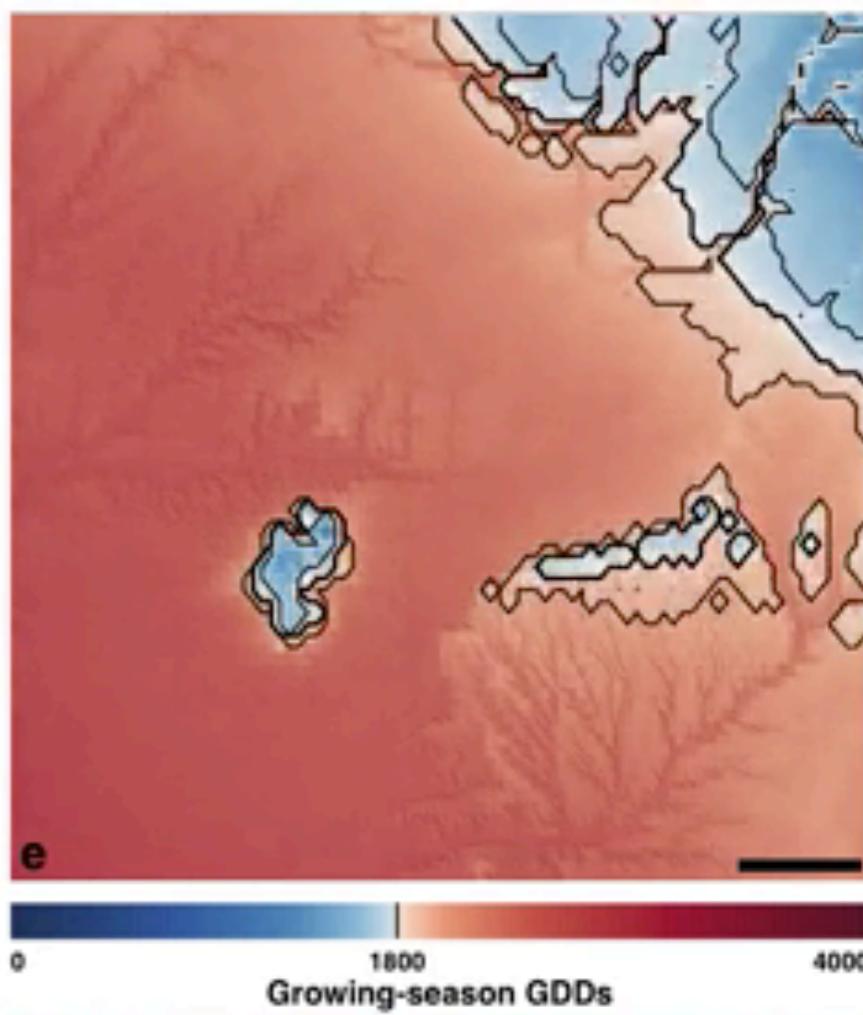
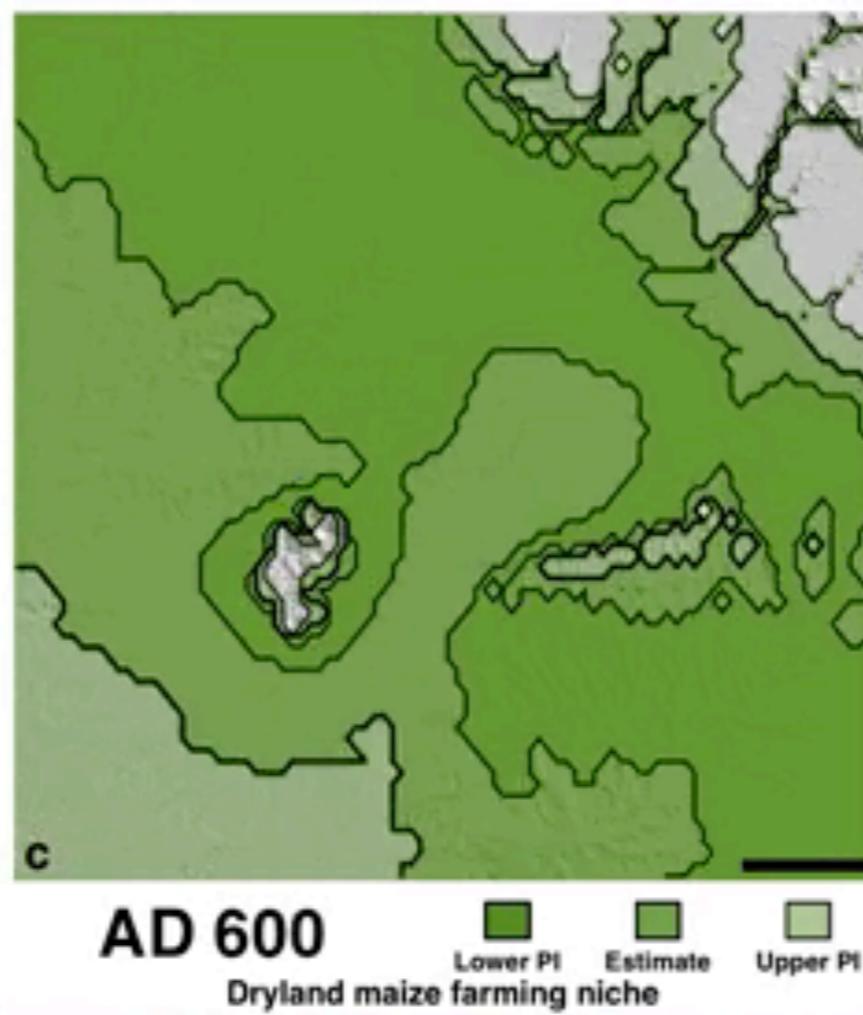
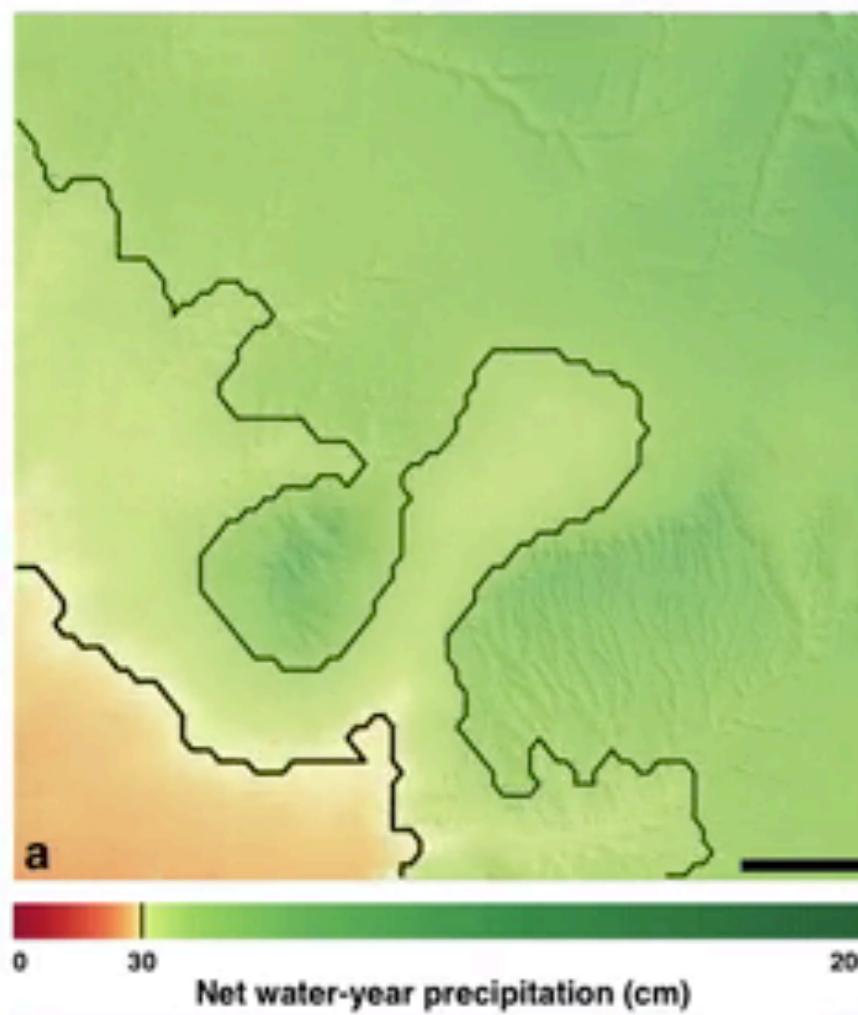


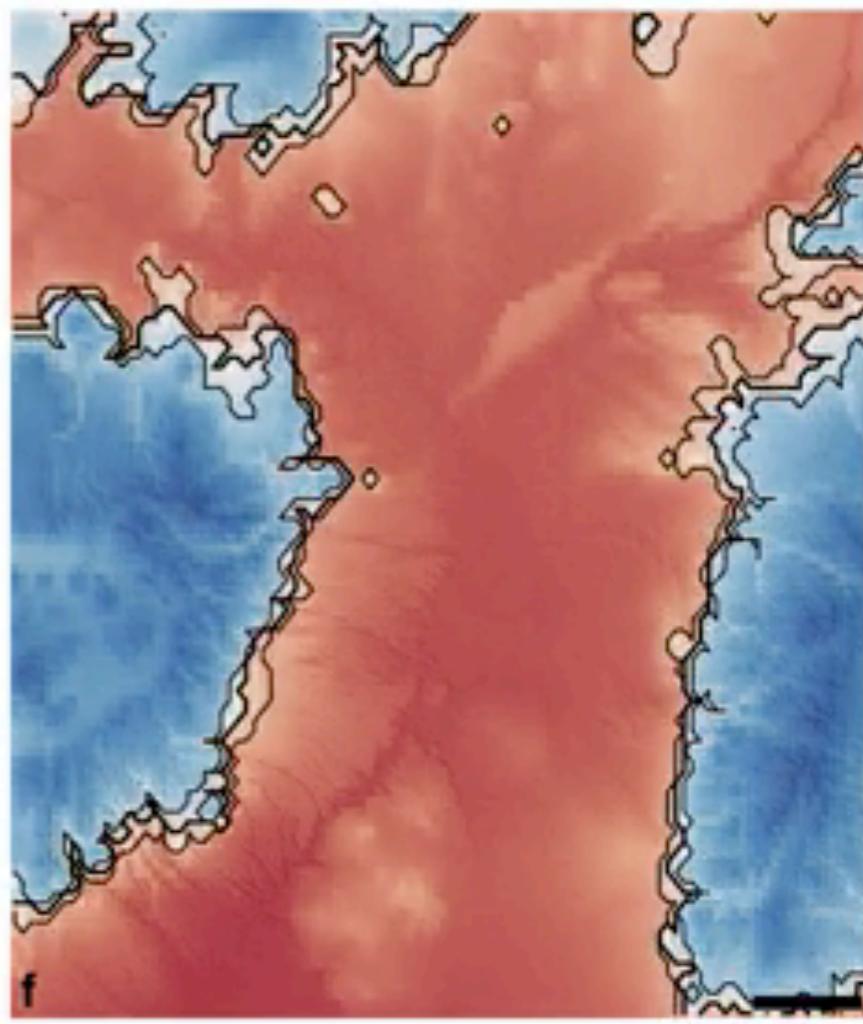
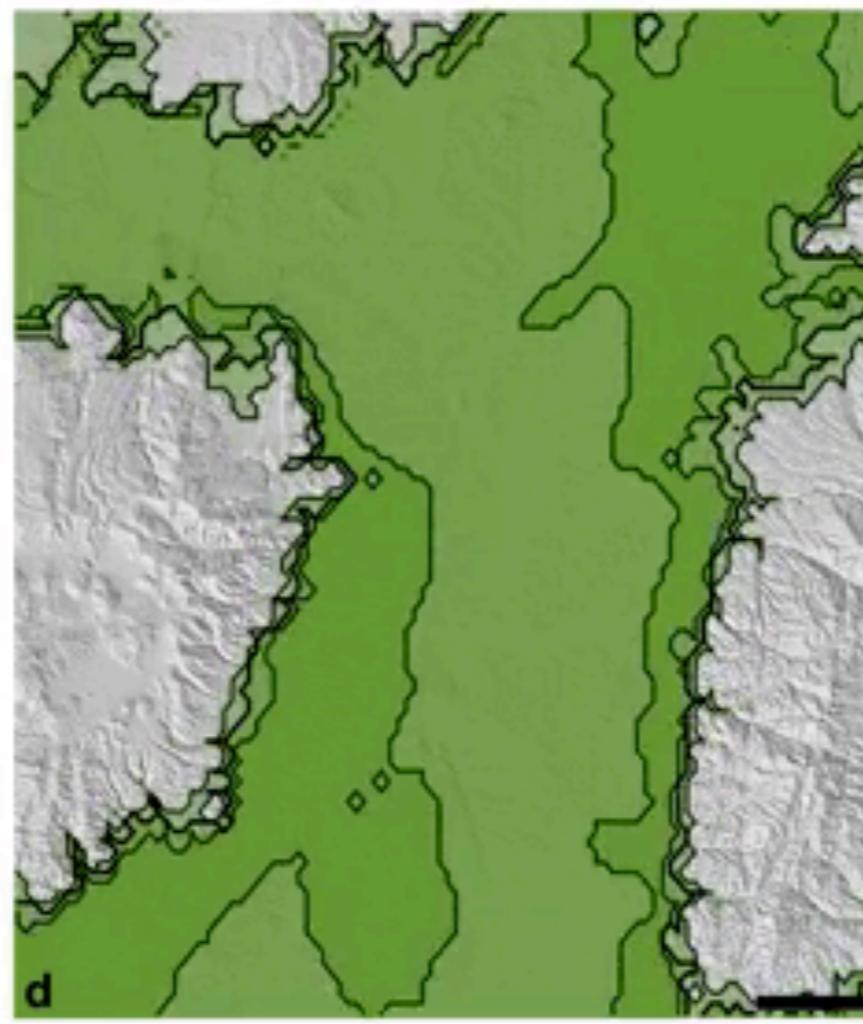
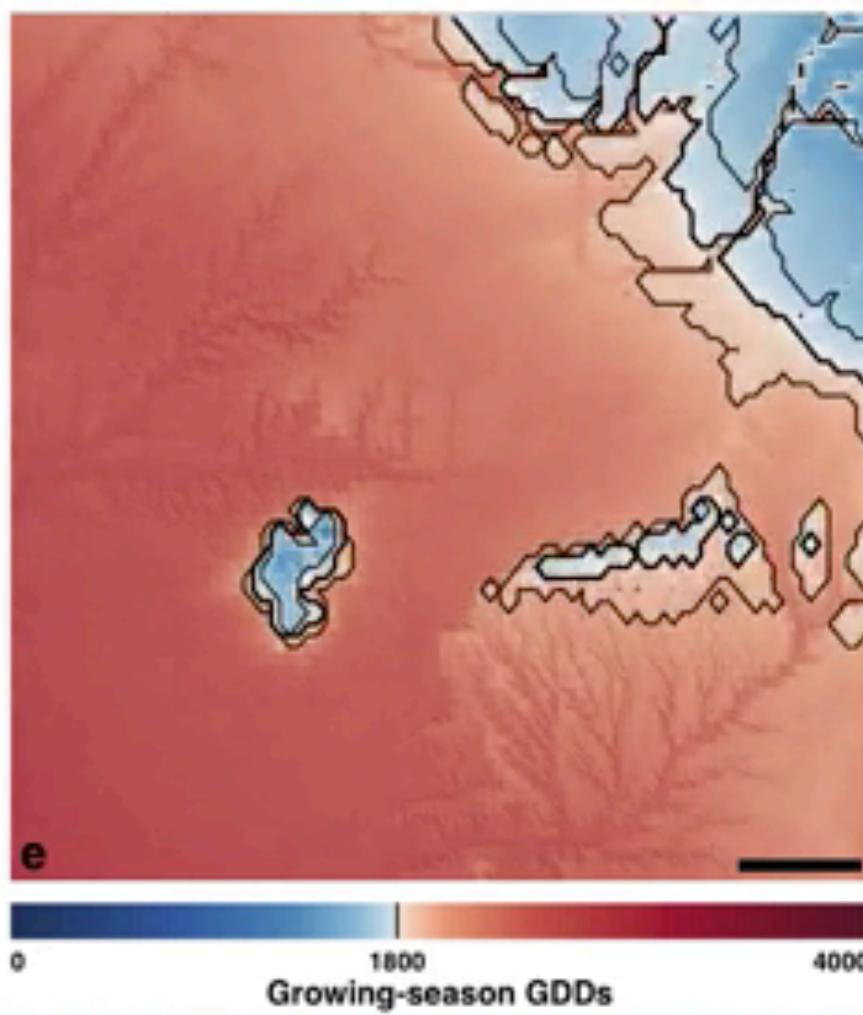
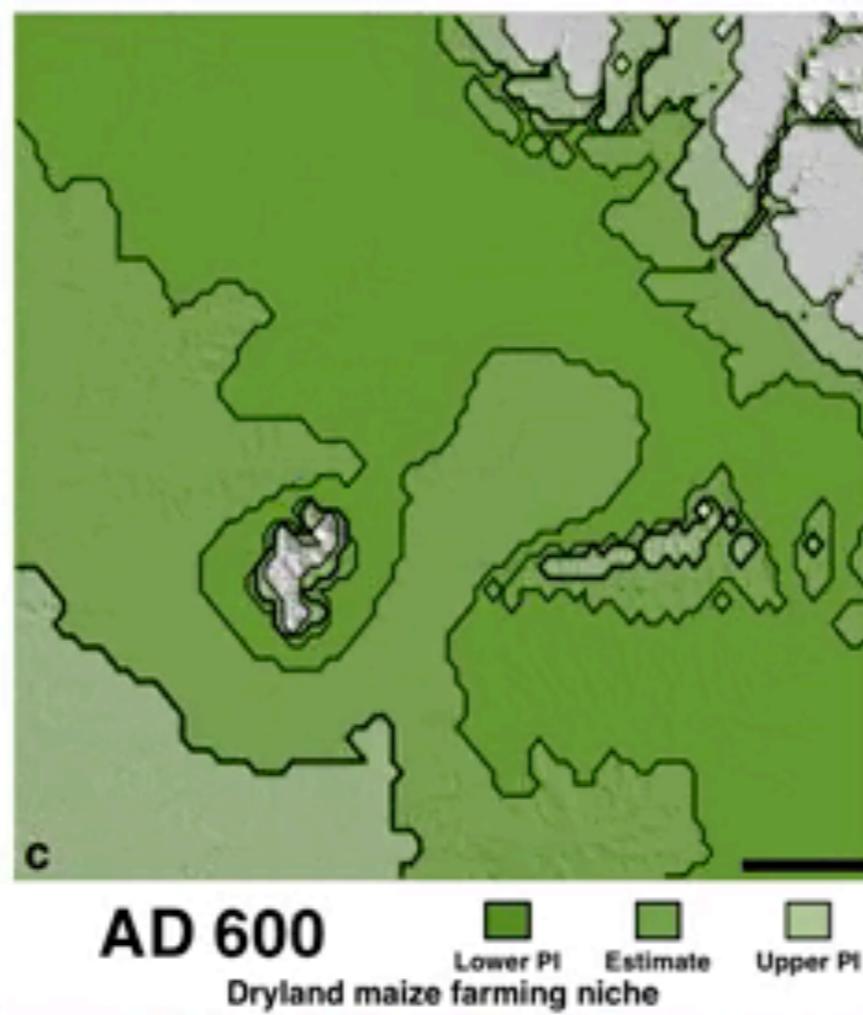
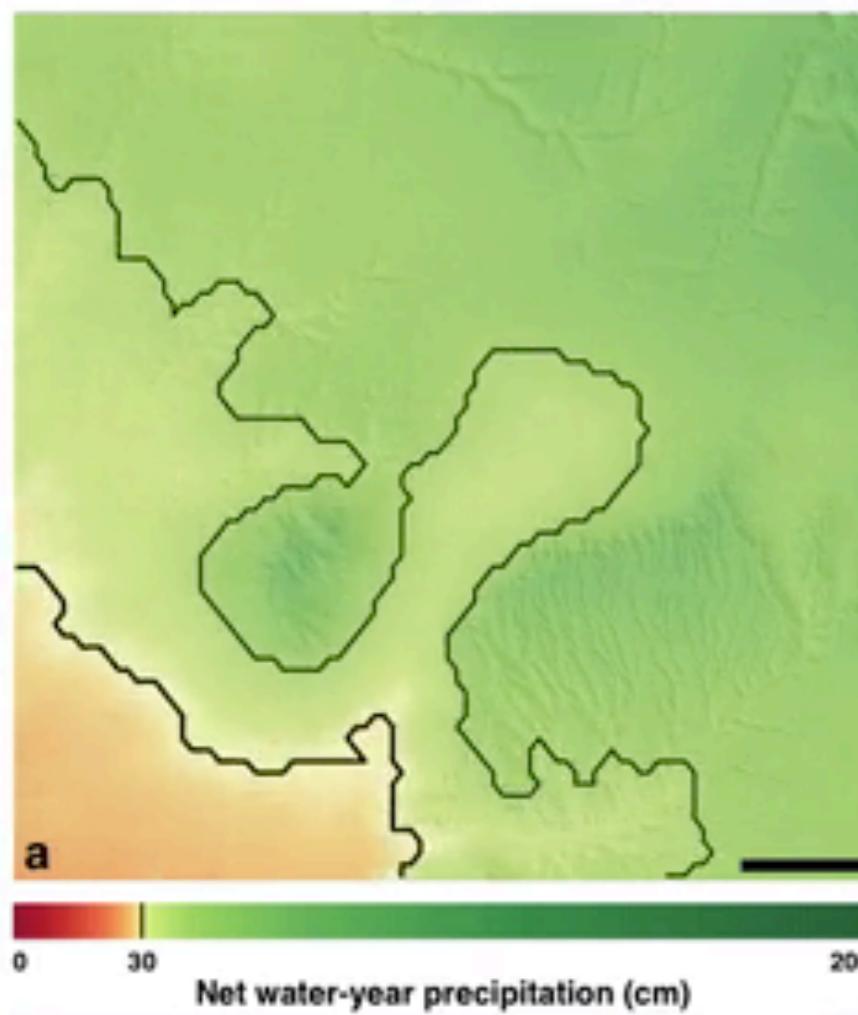
Lesson #1: Know what we want to learn from our models.
Are we simulating land use as *it was*,
or are we exploring land use as *it could have been*?

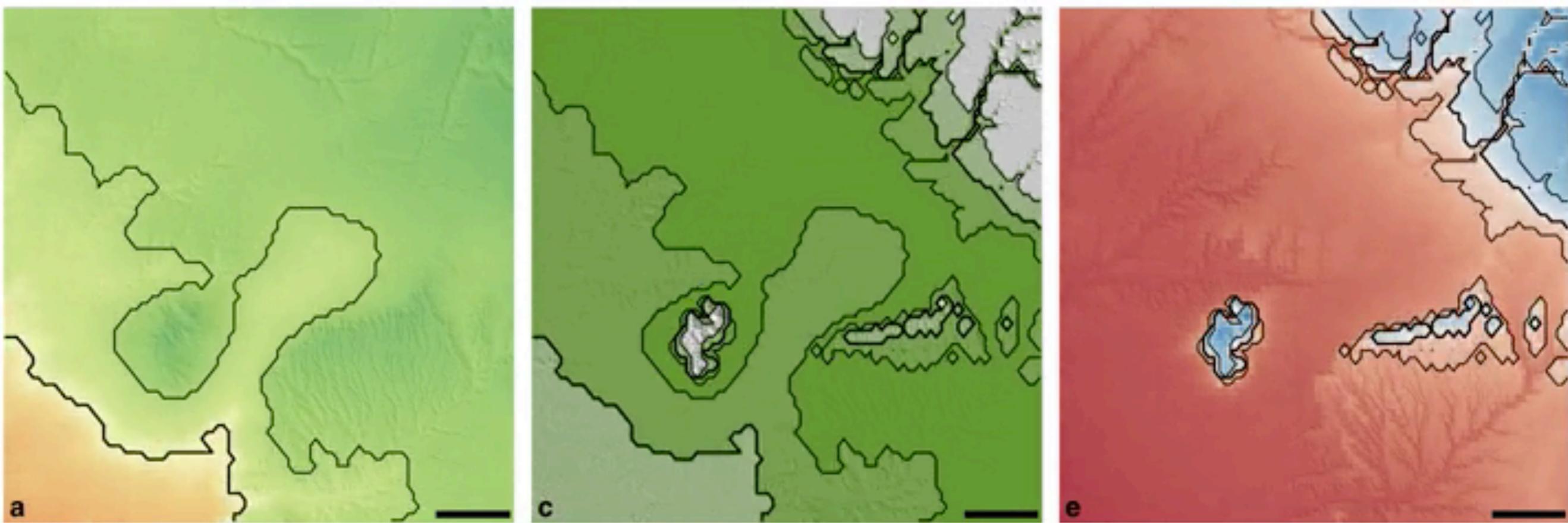
**Lesson #2: If we are interested in land use in the past,
we (archaeologists) are still going to have to do a lot on our own.**

**Run 1
600**

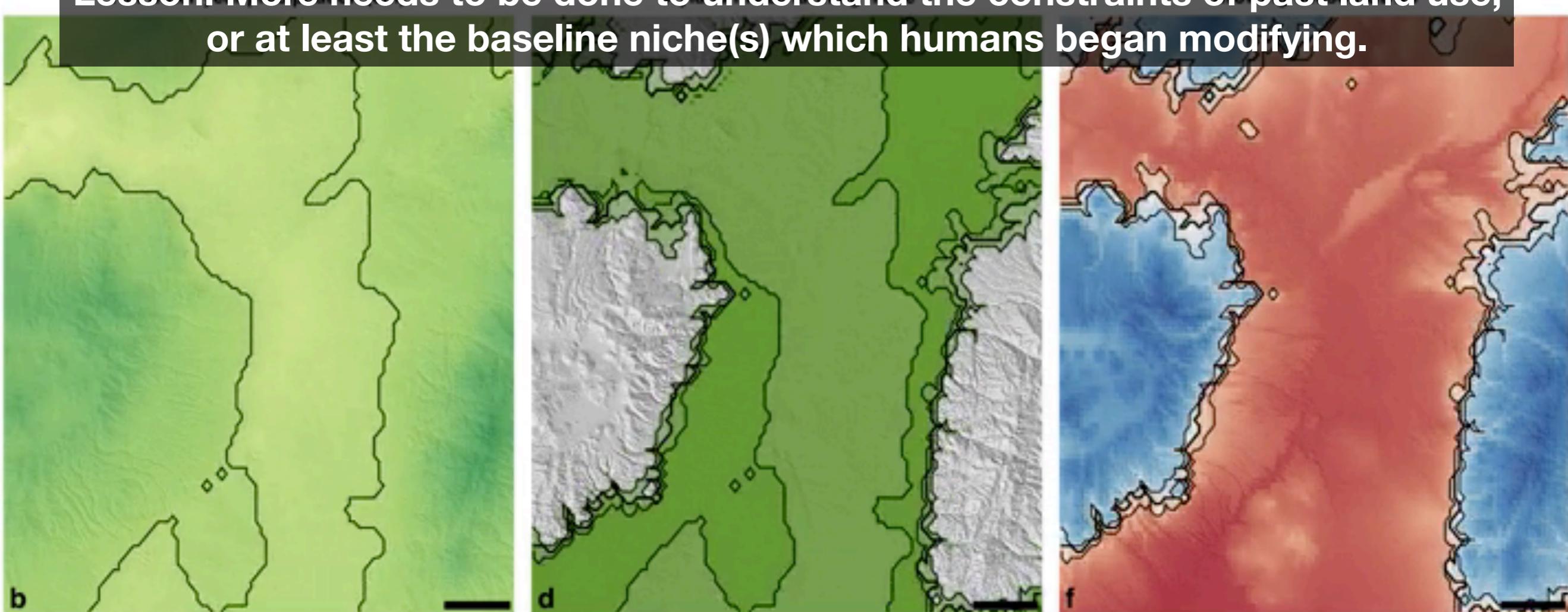
	Group Type (Preference)	Group Size (Households)	Tribute Flow (kg of maize)
■ Non-hierarchical	■ Hierarchical	○ 1 ○ 25 ○ 50	— 0 ■ 567

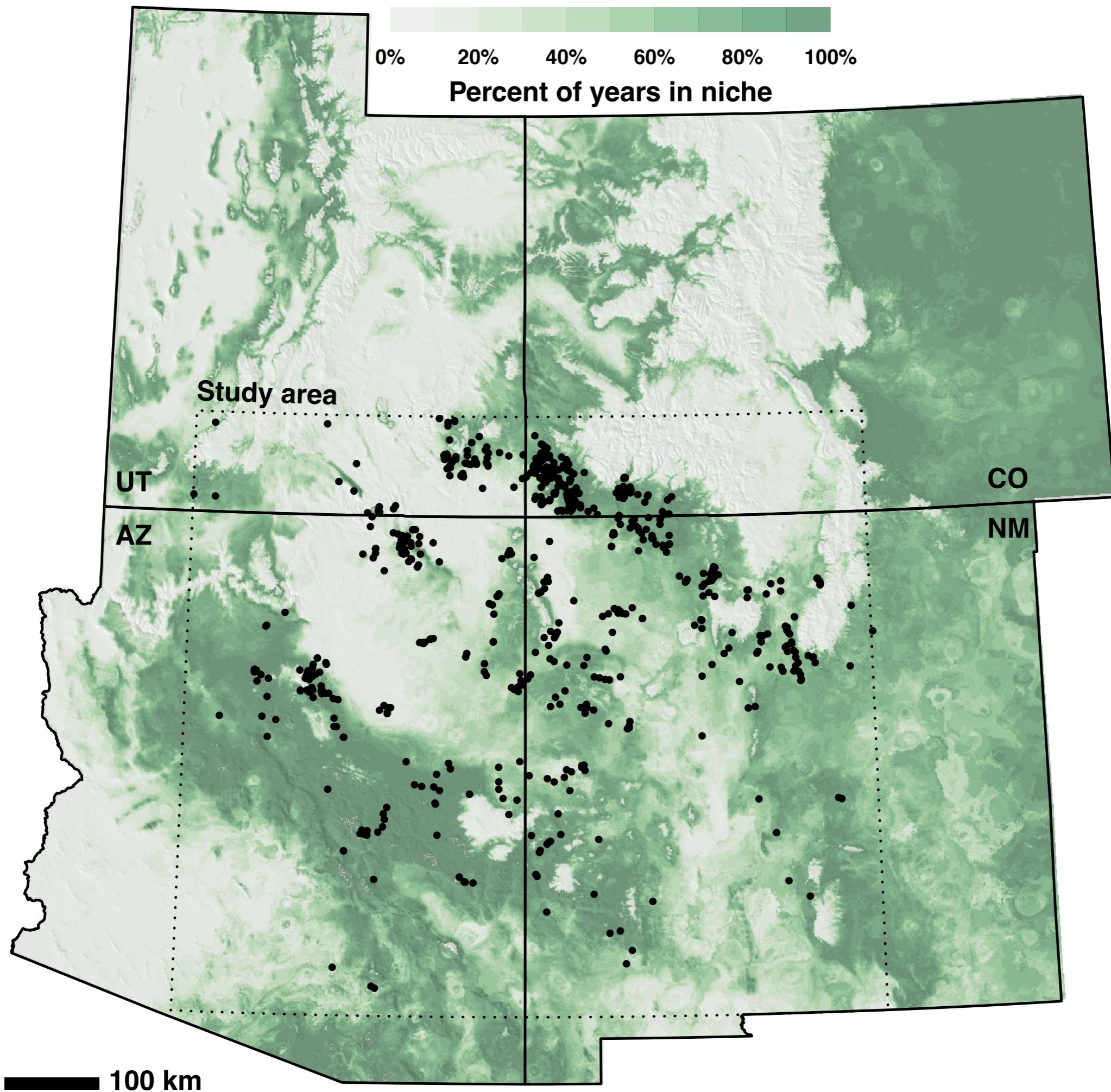


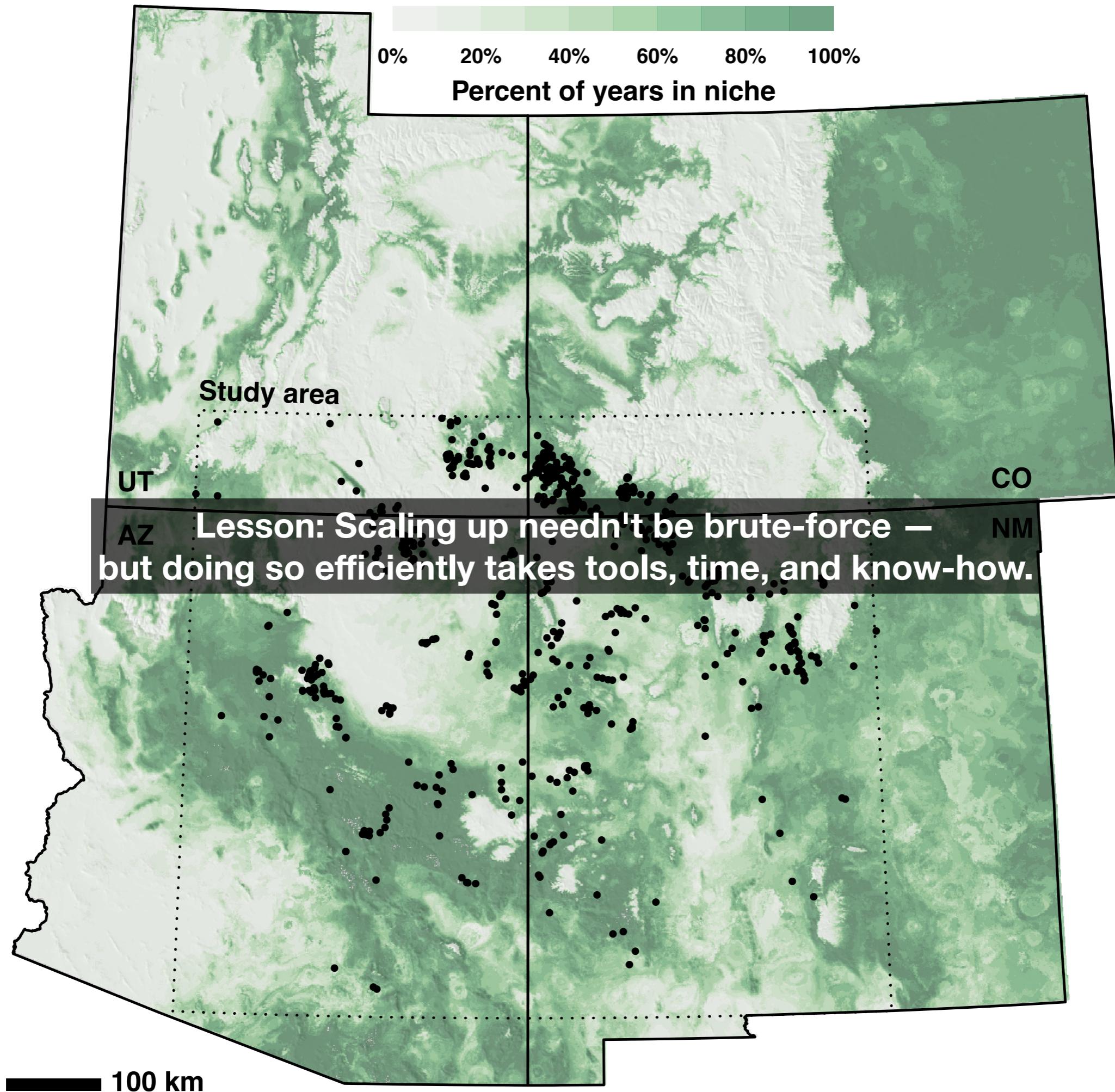


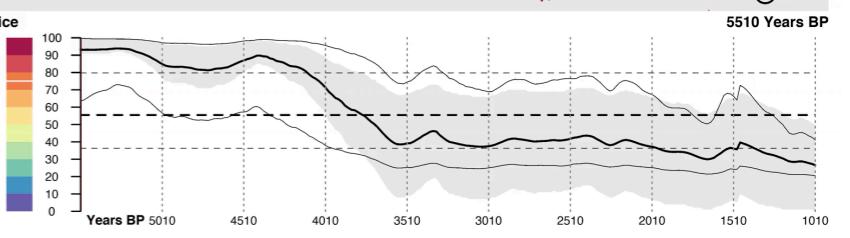
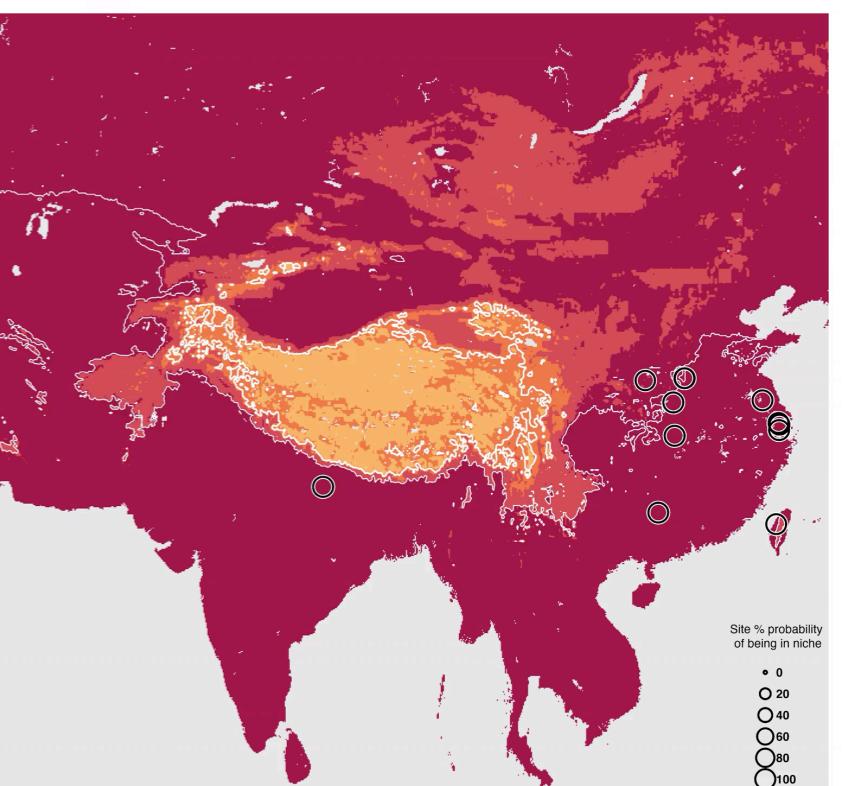
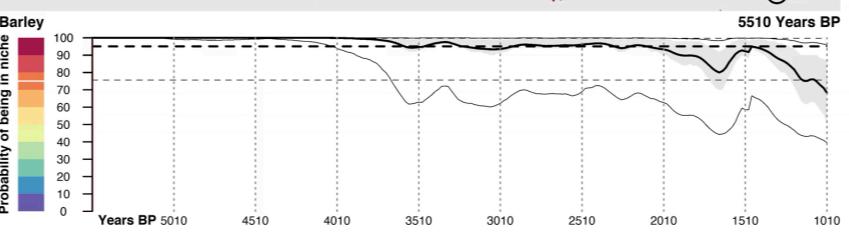
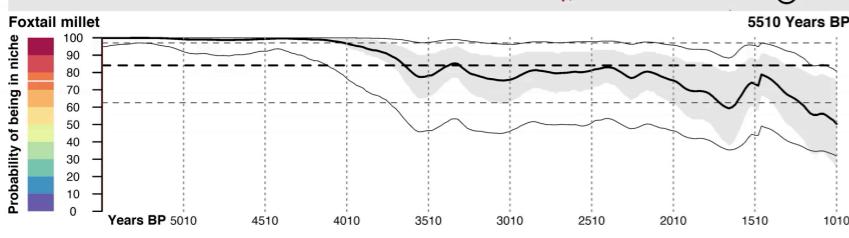
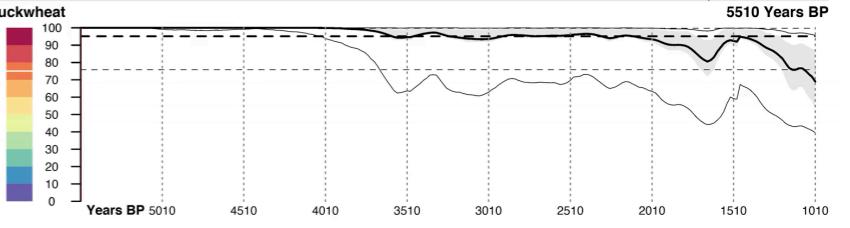
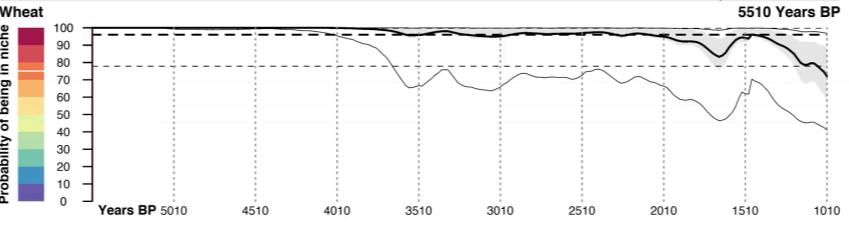
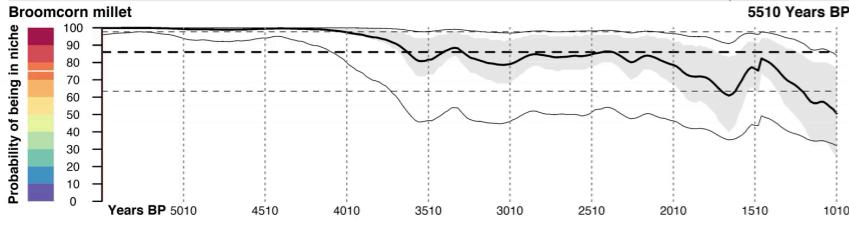


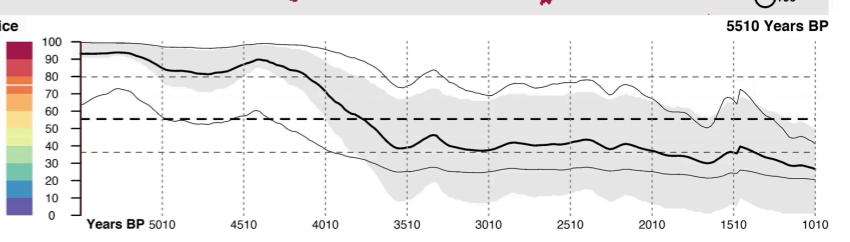
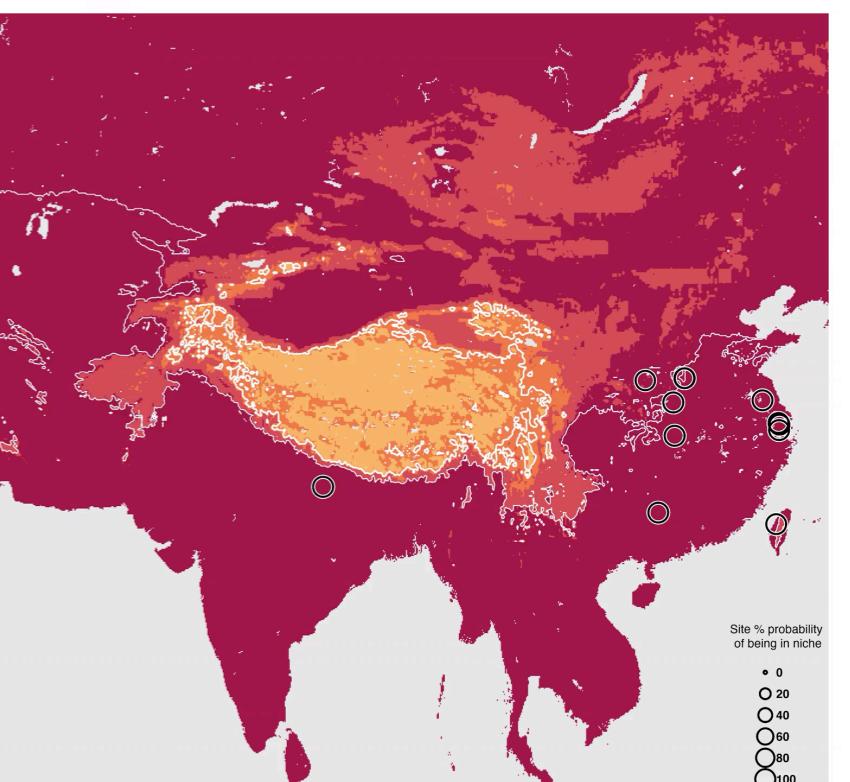
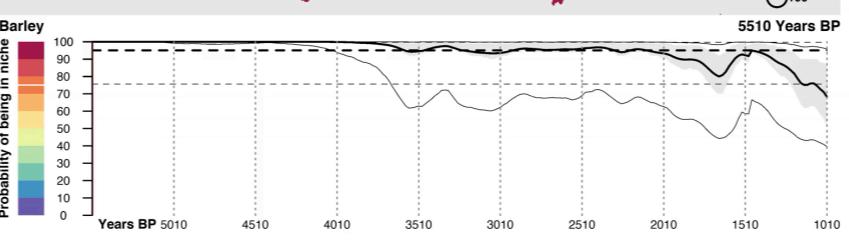
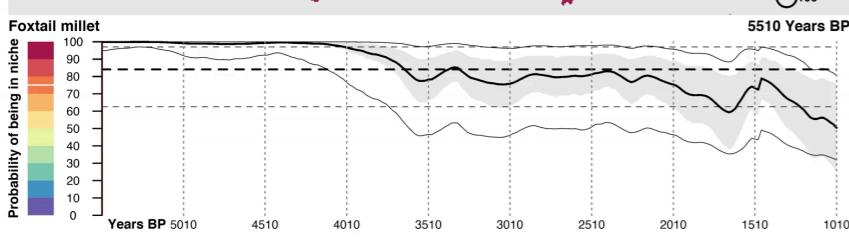
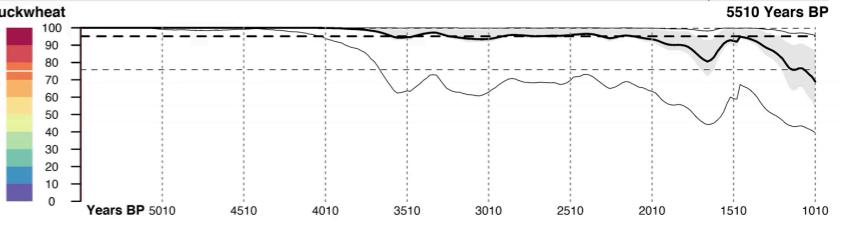
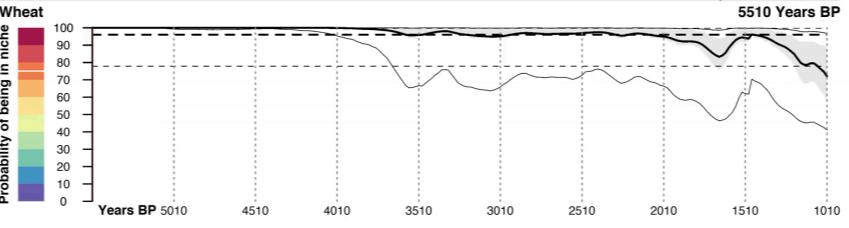
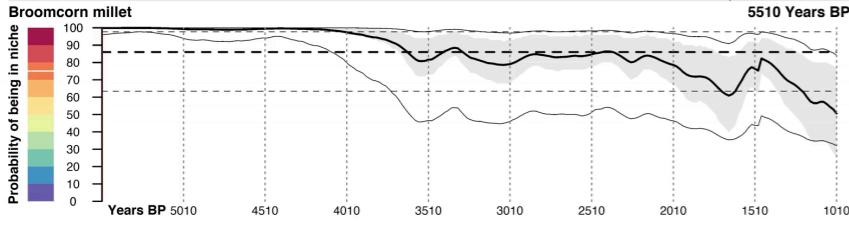
**Lesson: More needs to be done to understand the constraints of past land use,
or at least the baseline niche(s) which humans began modifying.**

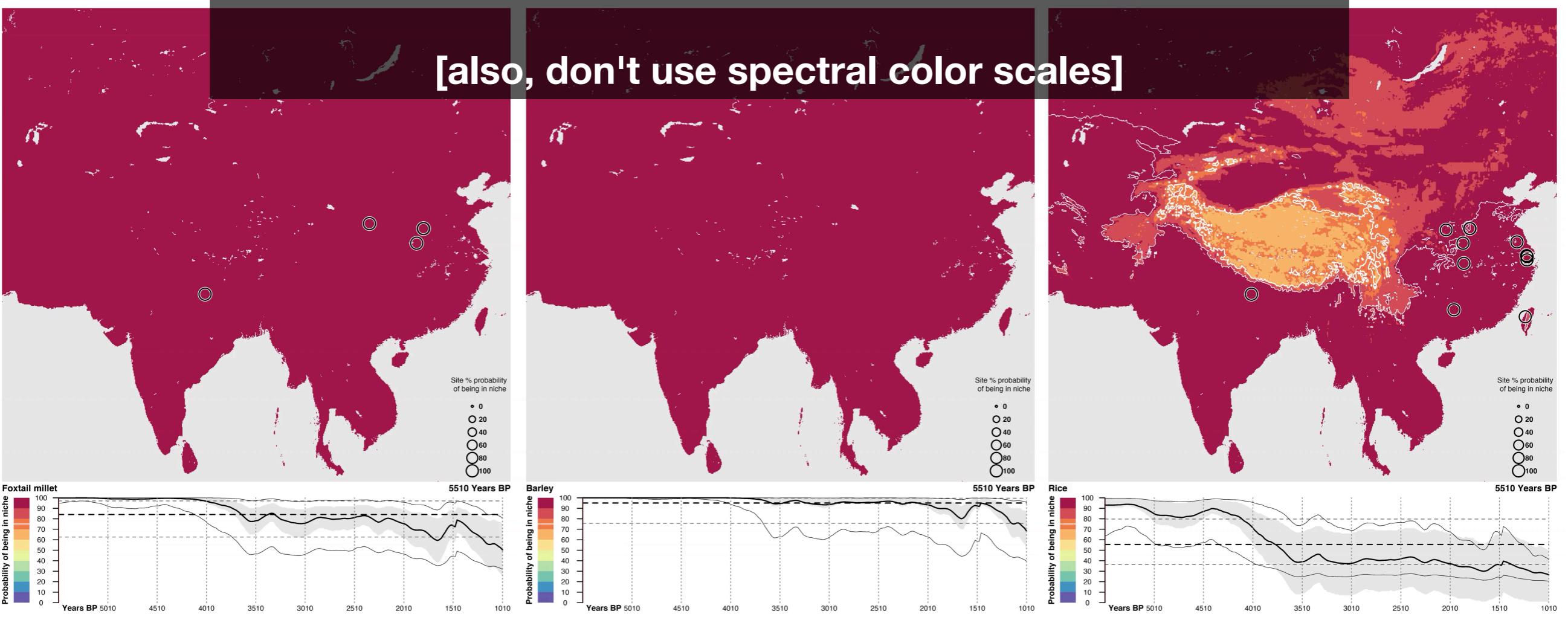
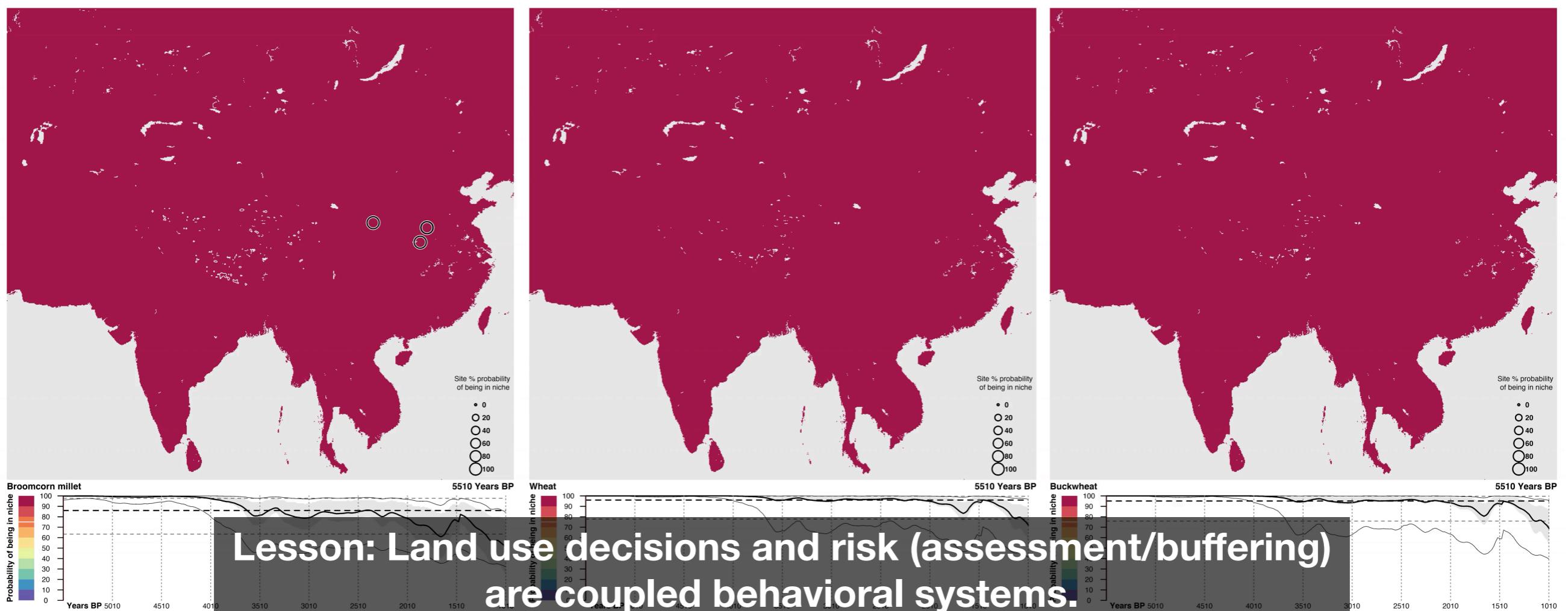












SKOPE

Synthesizing Knowledge of Past Environments



ALPHA

SKOPE PaleoCAR: SW USA Paleoclimatic Reconstruction



DISCOVER

INFO

MAP VIEW

GRAPH VIEW

DOWNLOAD

MODEL

Select variable to display

COLLAPSE ^

Growing Degree Days (F, May-Sept)

STYLE

Water-year (Oct-Sept) Precipitation (mm)

STYLE

Maize Farming Niche (Direct Precip.)

STYLE

Temporal controls

COLLAPSE ^

Date Range (year)

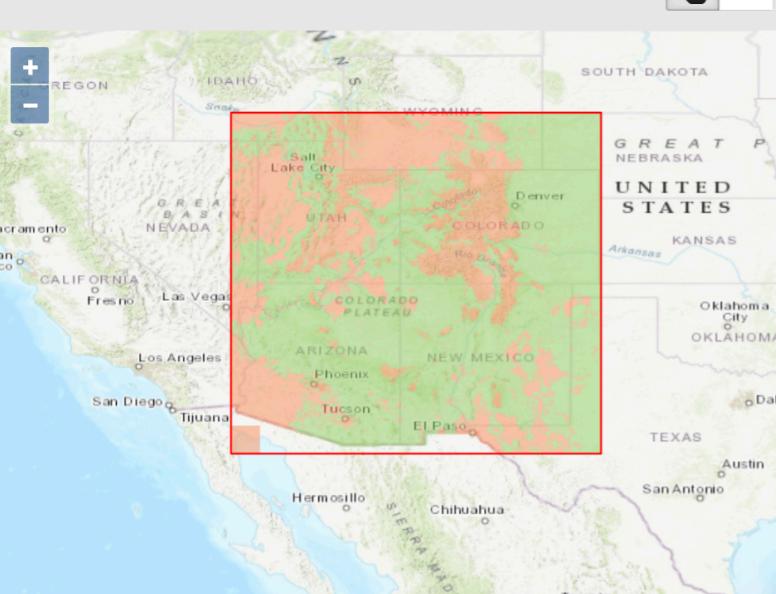
0001 - 2000

0001 2000

Select analytics boundary

COLLAPSE ^

Tools



Animation

◀ TO START ▶ PLAY ▶ TO END

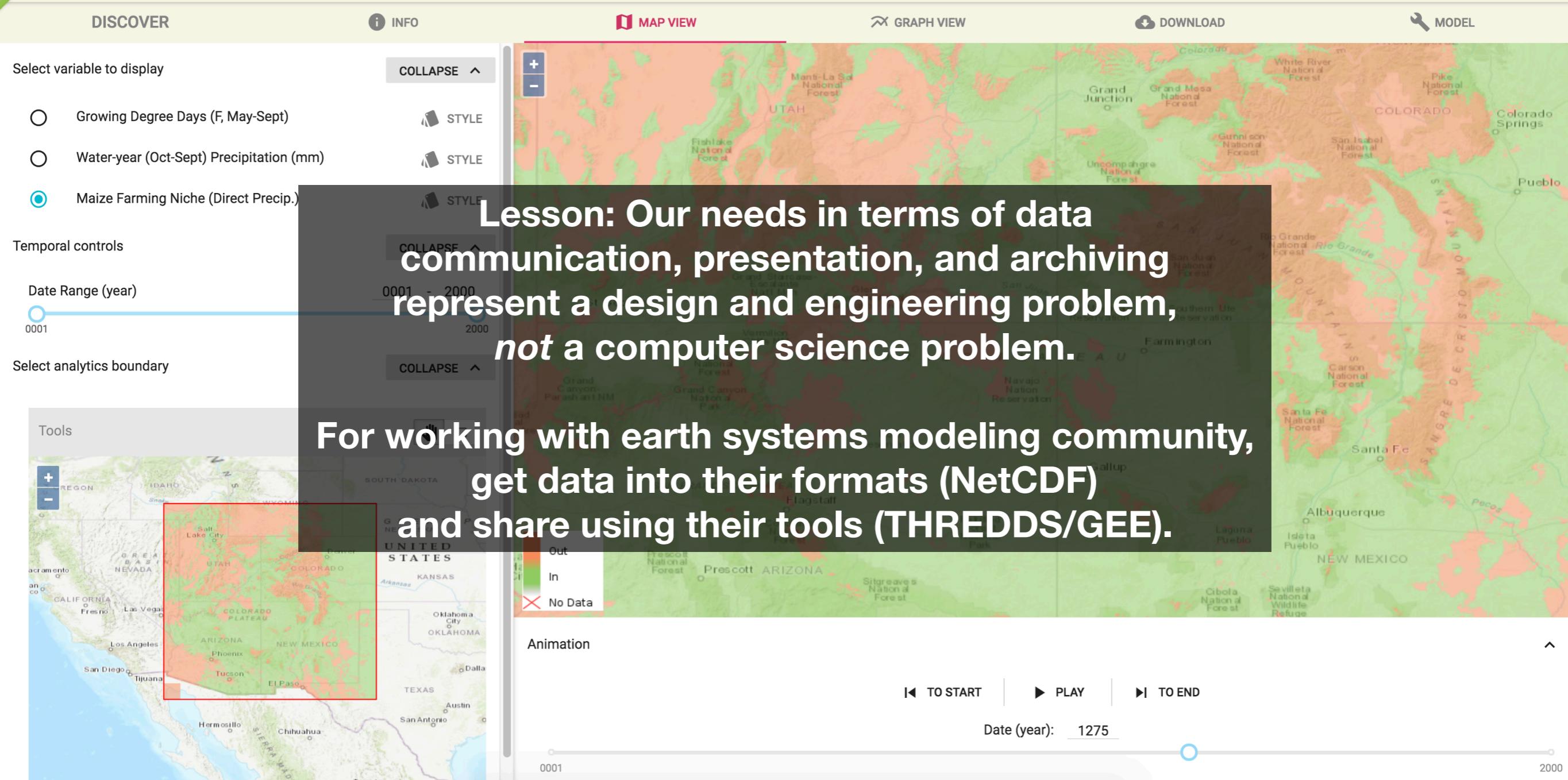
Date (year): 1275

0001

▲

2000

<https://www.openskope.org>



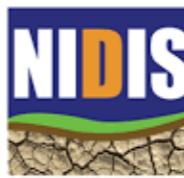
<https://www.openskope.org>



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SYSTEM



Make
Map

Make
Graph



MENU

Map

GET MAP LAYER

Variable ?

Type:

Climate

Dataset: ?

METDATA/gridMET

Variable: ?

Mean Temperature

Units: deg F

Computation

Resolution (Scale): ?

4000 m (1/24-deg)

Processing ?

Statistic (over time period):

Mean

Calculation:

Difference From Average Conditions

Time Period ?

Period of Record: 1979-01-01 to 2018-07-11

Season:

Last 60 Days of Data

Start Date: 2018-05-13

End Date: 2018-07-11

Year Range for Historical Avg/Distribution: ?

1981

- 2010

MENU Map

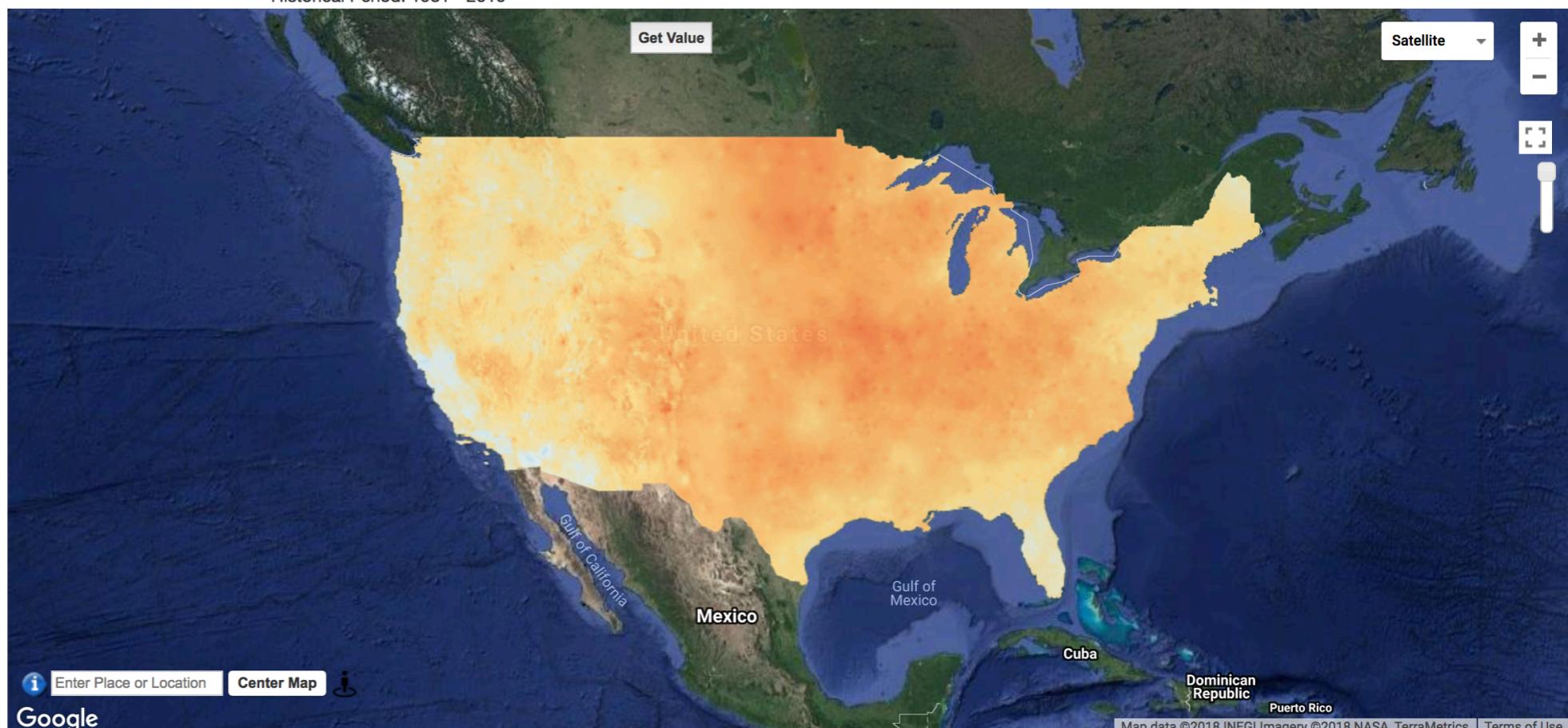
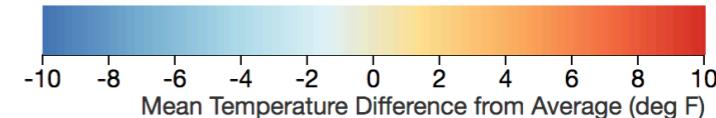
Colors Layers Masking Download

Link Reset

Mean Mean Temperature Difference from Average (gridMET)

Target Period: 2018-05-13 to 2018-07-11

Historical Period: 1981 - 2010



Data Source: METDATA/gridMET 4000 m (1/24-deg) daily dataset (University of Idaho)

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USGS
science for a changing world

Make Map Make Graph INFO

GET MAP LAYER

Variable ?
Type:
Climate
Dataset: ?
METDATA/gridMET
Variable: ?
Mean Temperature
Units: deg F

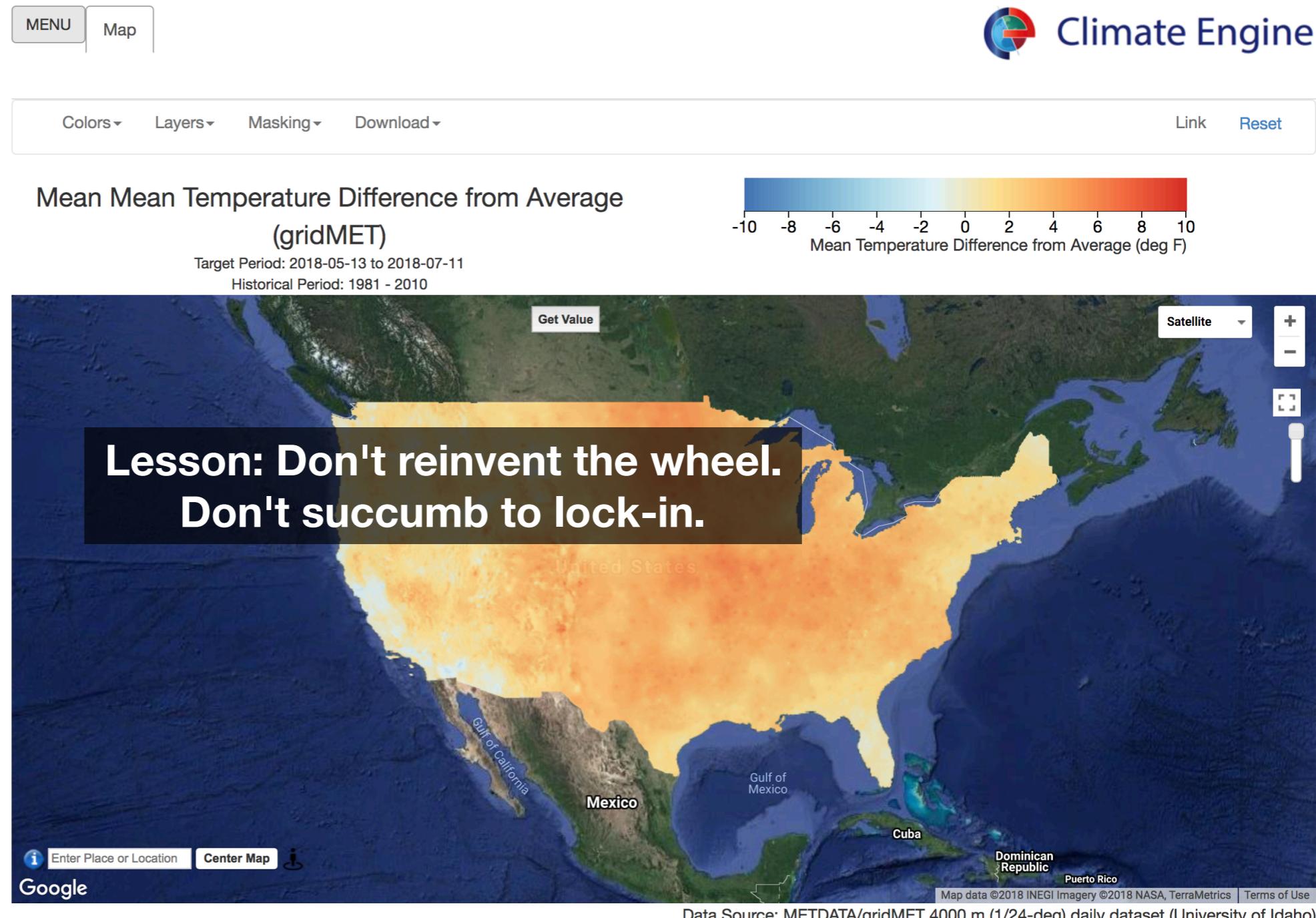
Computation
Resolution (Scale): ?
4000 m (1/24-deg)

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Statistic (over time period):
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Start Date: 2018-05-13
End Date: 2018-07-11

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1981 - 2010



Interests going forward:

- Modeling to understand **systems, histories, and structural constraints**
- Development and maintenance of crop landraces – function of **cultural heuristics**
- Scales of environmental information encoding/decoding – **CAS as processors**
- **AgriCultural analogs** – not only climate, but also social org/scale, crops, technologies, values, histories