Results

March 21, 2024

[1]:
```
# required import
import os
import geopandas as gpd
import pandas as pd
import matplotlib.pyplot as plt
import matplotlib.font_manager as fm
import matplotlib as mpl
import numpy as np
from matplotlib_scalebar.scalebar import ScaleBar

# helper scripts to read in spatial results using pandas and geopandas
import read_voi

os.chdir('../..')
```

0.1 Import Results Using Pandas and Geopandas

[2]:
```
par_results = 'results/reference/parallel/'
ser_results = 'results/reference/serial/'
```

[3]:
```
# read in integrated spatial model results using pandas
int_df_par = pd.read_csv(f'{par_results}bigsp.35072_00i.0')
int_df_ser = pd.read_csv(f'{ser_results}bigsp.35072_00i')

# read in voronoi from serial, they should be identical between but reading in␣
 ↪both for demonstrative purposes
voi_ser,_ = read_voi.read_voi_file(f'{ser_results}bigsp_voi',join=int_df_ser)
voi_par = read_voi.merge_parallel_voi(f'{par_results}bigsp_voi',join=int_df_par)
```

```
Coordinate Reference System (CRS) was not added to the GeoDataFrame
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```
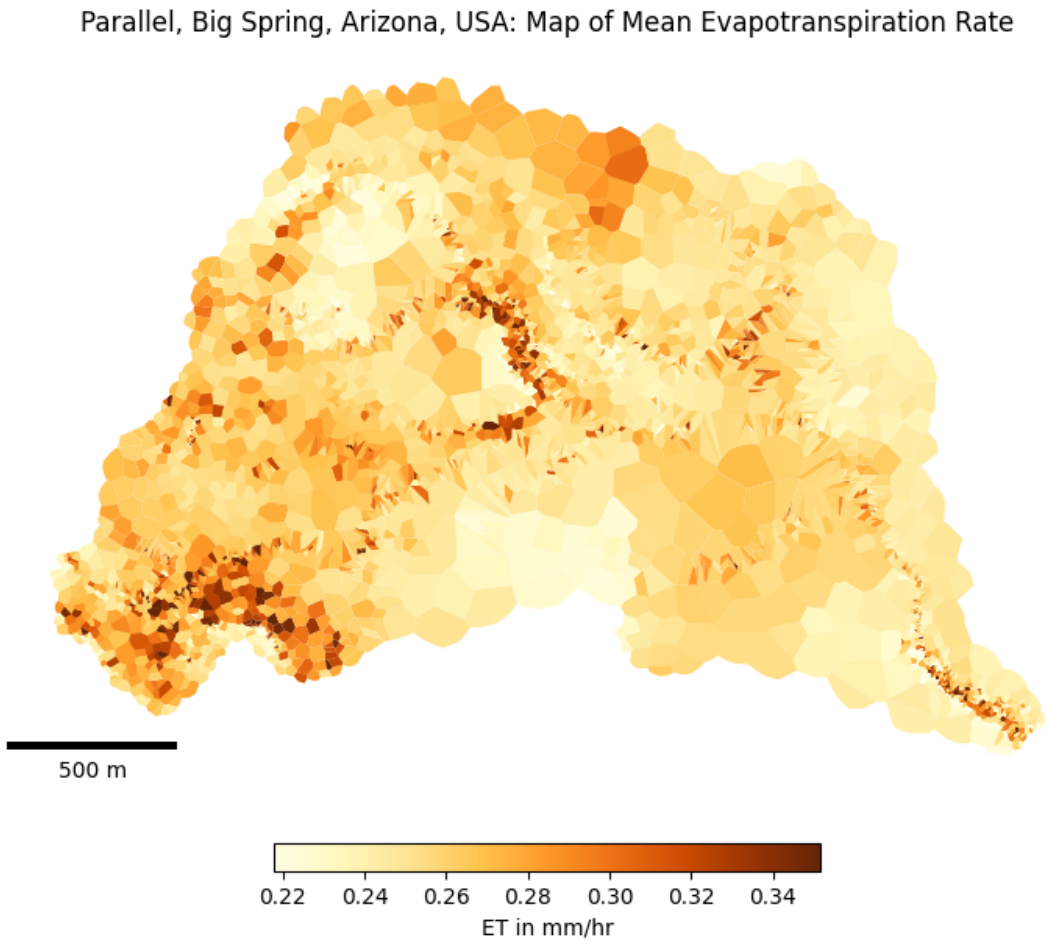

0.2 Plot Spatial Maps of Mean Evapotranspiration Rates Averaged Over The Length of Simulation

0.2.1 Parallel

[4]:
```
cm = 1/2.54  # centimeters in inches
fig,ax = plt.subplots(figsize=[18*cm,18*cm],layout='constrained')
low = np.percentile(voi_par['AvET'], 2.5)
high = np.percentile(voi_par['AvET'], 97.5)
voi_par.
 ↪plot(ax=ax,column='AvET',cmap='YlOrBr',legend=True,vmin=low,vmax=high,legend_kwds={'label':
 ↪ r'ET in mm/hr','orientation': 'horizontal","shrink":.5})
ax.add_artist(ScaleBar(1,location='lower left'))
plt.title('Parallel, Big Spring, Arizona, USA: Map of Mean Evapotranspiration␣
 ↪Rate')
plt.axis('off')
```

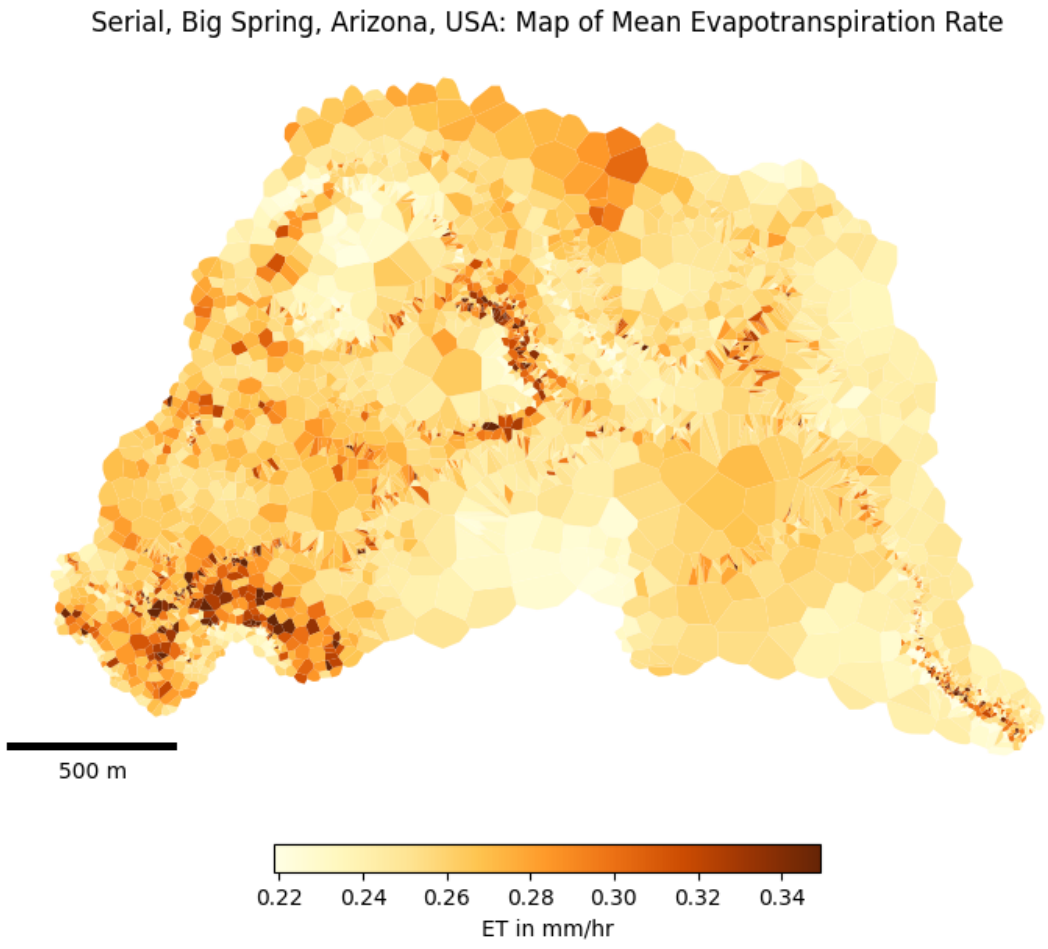
[4]: (398890.1927464, 402101.1984916, 3890706.5018402, 3892894.6910698004)



0.2.2 Serial

[5]:
```
fig,ax = plt.subplots(figsize=[18*cm,18*cm],layout='constrained')
low = np.percentile(voi_ser['AvET'], 2.5)
high = np.percentile(voi_ser['AvET'], 97.5)
voi_ser.
 ↪plot(ax=ax,column='AvET',cmap='YlOrBr',legend=True,vmin=low,vmax=high,legend_kwds={'label':
 ↪ r'ET in mm/hr','orientation': 'horizontal',"shrink":.5})
ax.add_artist(ScaleBar(1,location='lower left'))
plt.title('Serial, Big Spring, Arizona, USA: Map of Mean Evapotranspiration␣
 ↪Rate')
plt.axis('off')
```

[5]:
```
(398890.1927464, 402101.1984916, 3890706.5018402, 3892894.6910698004)
```



0.3 Plot Parallel Partitioning

[6]:
```
fig,ax = plt.subplots(figsize=[18*cm,18*cm],layout='constrained')
voi_par.
 ↪plot(ax=ax,column='processor',cmap='Set2',legend=True,legend_kwds={'label':␣
 ↪'Core #','orientation': 'horizontal',"shrink":.5})
ax.add_artist(ScaleBar(1,location='lower left'))
plt.title('Big Spring, Arizona, USA: Partition map')
plt.axis('off')
```

[6]: (398890.1927464, 402101.1984916, 3890706.5018402, 3892894.6910698004)