Visualization 1

What can we learn from the visualization?

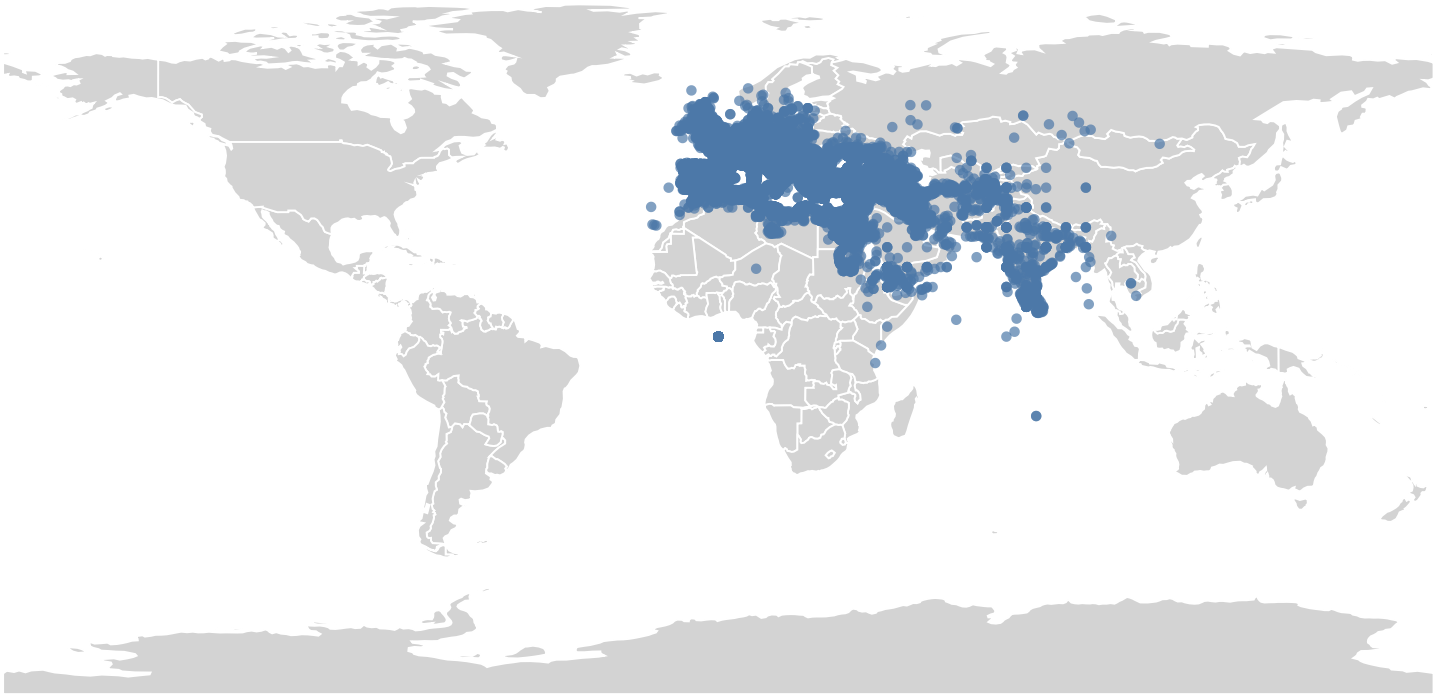
To get an overview of the data by understanding the distribution of the recorded coordinates, any identified points of interest and their relative location on the world map as we know it today.

What is the name for the type of visualization(s) used?

Map

```
import altair as alt
from vega_datasets import data

places = ('https://raw.githubusercontent.com/SwanseaU-TTW/csc337_coursework1/master/ple
graticule = alt.topo_feature(data.world_110m.url, 'countries')

featureTypesSelector = alt.selection_single(empty='all', fields=['featureTypes'])

mapBase = alt.Chart(graticule).mark_geoshape(
    fill='lightgray',
    stroke='white'
).project(
    'equirectangular'
).properties(
    width=750,
    height=500
)

placePoints = alt.Chart(places).mark_circle().encode(
    latitude='reprLat:Q',
    longitude='reprLong:Q',
    tooltip=['title:N', 'featureTypes:N']
).transform_filter(
    featureTypesSelector
).properties(
    title="Identified coordinates for the pleiades places dataset"
).add_selection(featureTypesSelector)

(mapBase + placePoints).configure_view(stroke=None)
```

Identified coordinates for the pleiades places dataset



What are all visual mappings used?

latitude

reprLat

longitude

reprLong

tooltip

title, featureTypes

Was there any special data preparation done?

The data is dynamically filtered such that when a data point on the map is clicked, only data points that are of the same featureType as the point clicked are rendered on the map. Clicking on any space on the map besides a data point resets the filter.

What are the limitations of your design?

More interaction with the map such as the ability to pan and zoom would be beneficial. Further, being able to show the connections between places might help provide more context and, thus, a better understanding of the dataset.

Visualization 2

What can we learn from the visualization?

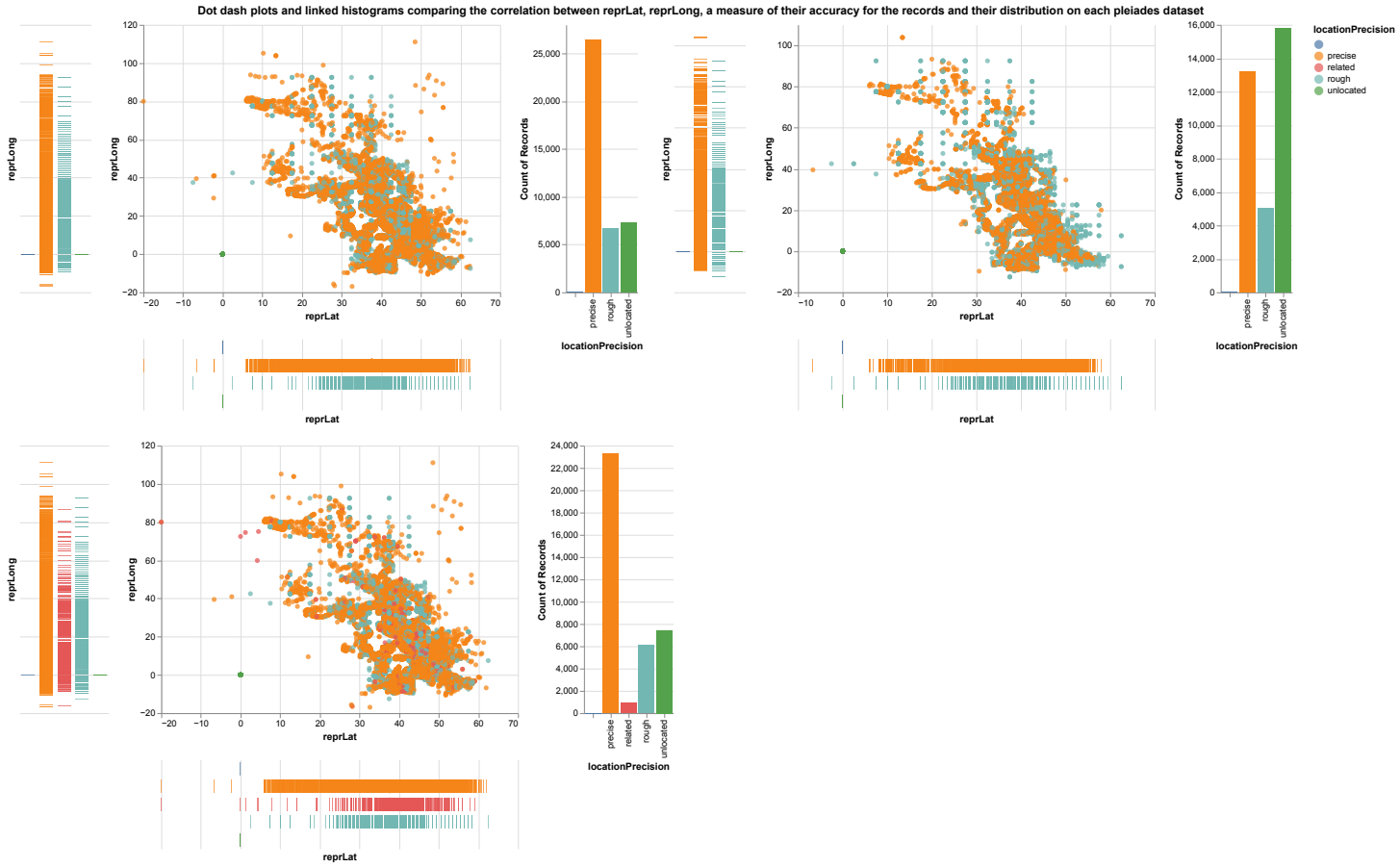
To understand the correlation between the latitude and longitude coordinates across each pleiades dataset and the precision of the coordinates

What is the name for the type of visualization(s) used?

Dot Dash Plot with linked histogram

```
import altair as alt

locations = ('https://raw.githubusercontent.com/SwanseaU-TTW/csc337_coursework1/master/
names = ('https://raw.githubusercontent.com/SwanseaU-TTW/csc337_coursework1/master/plei
places = ('https://raw.githubusercontent.com/SwanseaU-TTW/csc337_coursework1/master/ple

brush = alt.selection_interval()
tick_axis = alt.Axis(labels=False, domain=False, ticks=False)

def scatter(source):
    return (
        alt.Chart(source).mark_circle(opacity=0.75).encode(
            x='reprLat:Q',
            y='reprLong:Q',
            color=alt.condition(brush, 'locationPrecision:N', alt.value('lightgray')),
            tooltip=['title:N', 'reprLatLong:N', 'minDate:N', 'maxDate:N']
        ).add_selection(brush)
    )

def xTicks(source):
    return alt.Chart(source).mark_tick().encode(
        alt.X('reprLat:Q', axis=tick_axis),
        alt.Y('locationPrecision:N', title='', axis=tick_axis),
        color=alt.condition(brush, 'locationPrecision:N', alt.value('lightgrey')),
    ).add_selection(brush)

def yTicks(source):
    return alt.Chart(source).mark_tick().encode(
        alt.X('locationPrecision:N', title='', axis=tick_axis),
        alt.Y('reprLong:Q', axis=tick_axis),
        color=alt.condition(brush, 'locationPrecision:N', alt.value('lightgrey'))
    ).add_selection(brush)

def histo(source):
    return (
        alt.Chart(source).mark_bar().encode(
            x='locationPrecision:N',
            y='count(locationPrecision):Q',
            color='locationPrecision:N',
            tooltip=['count(locationPrecision):N']
        ).transform_filter(
            brush
        ).interactive()
    )

def dotDashPlot(sources):
    return yTicks(sources) | (scatter(sources) & xTicks(sources)) | histo(sources)

alt.vconcat(
    (dotDashPlot(locations) | dotDashPlot(names)),
    dotDashPlot(places)
```

```
).properties(
    title='Dot dash plots and linked histograms comparing the correlation between reprLa
).configure_title(orient='top', anchor='middle').configure_view(stroke=None)
```



What are all visual mappings used?

For each pleiades dataset,

scatter plot

x position: reprLat

y position: reprLong

color: conditionally locationPrecision or lightgray

tooltip: title, reprLatLong, minDate, maxDate

x-axis strip plot

x position: reprLat

y position: locationPrecision

color: conditionally locationPrecision or lightgray

y-axis strip plot

x position: locationPrecision

y position: reprLong

color: conditionally locationPrecision or lightgray

histogram

x position: locationPrecision

y position: count of locationPrecision records

color: locationPrecision

tooltip: count of locationPrecision records

Was there any special data preparation done?

Linked brushing is set up such that when an area on a scatter plot is highlighted, corresponding areas on the other scatter plots are highlighted and the connected strip plot and histogram for each are dynamically updated. Clicking on any space on any scatter plot besides a data point resets the visualization.

What are the limitations of your design?

The visualization could be improved by adding input elements such as checkboxes, dropdowns and/or radio buttons to allow the ability to choose what coordinates to display based on a selected precision. A line of best fit might also be beneficial in understanding the correlation betwen the latitude and longitude data channels.

Visualization 3

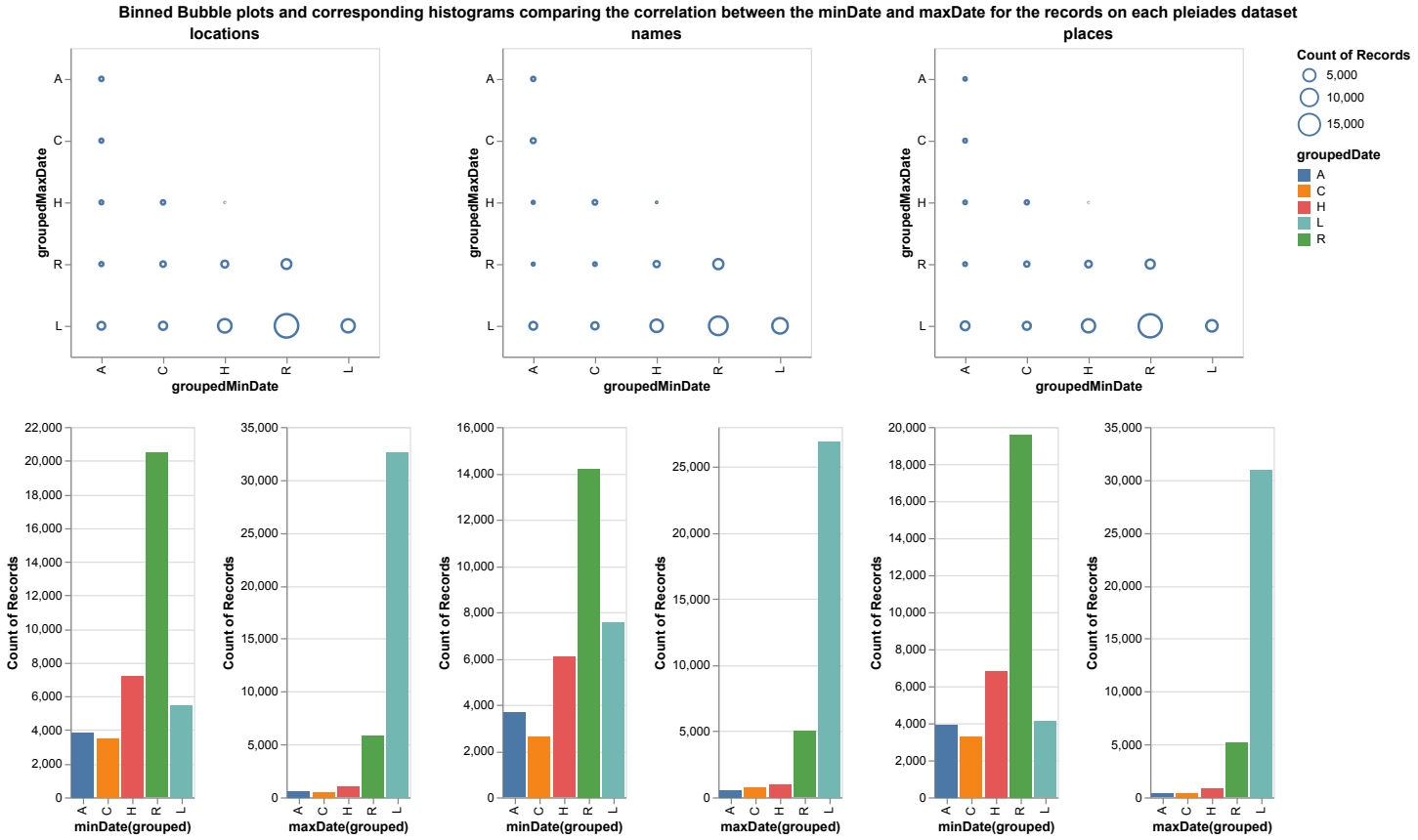
What can we learn from the visualization?

To understand the correlation between the minDate and maxDate for the records across each pleiades dataset

What is the name for the type of visualization(s) used?

Binned bubble plot and histogram

```
import altair as alt

locations = ('https://raw.githubusercontent.com/SwanseaU-TTW/csc337_coursework1/master/
names = ('https://raw.githubusercontent.com/SwanseaU-TTW/csc337_coursework1/master/plei
places = ('https://raw.githubusercontent.com/SwanseaU-TTW/csc337_coursework1/master/ple

def binnedBubblePlot(title, source):
    return (
        alt.Chart(source).transform_calculate(
            groupedMinDate='datum.minDate < -550 ? "A" : datum.minDate < -330 ? "C" : da
        ).transform_calculate(
            groupedMaxDate='datum.maxDate < -550 ? "A" : datum.maxDate < -330 ? "C" : da
        ).mark_point().encode(
            alt.X("groupedMinDate:O", sort=['A', 'C', 'H', 'R', 'L']),
            alt.Y("groupedMaxDate:O", sort=['A', 'C', 'H', 'R', 'L']),
            size='count():N',
            tooltip=['count()']
        ).properties(width=250, height=250, title=f'{title}')
    )

def histo(source, column):
    return (
        alt.Chart(source).transform_calculate(
            groupedDate=f'datum.{column} < -550 ? "A" : datum.{column} < -330 ? "C" : da
        ).mark_bar().encode(
            alt.X("groupedDate:O", sort=['A', 'C', 'H', 'R', 'L'], title=f'{column}(grou
            alt.Y('count()'),
            color='groupedDate:N',
            tooltip=['groupedDate:N', 'count()']
        ).interactive()
    )

def combi(title, source):
    return (
        binnedBubblePlot(title, source) & (histo(source, 'minDate') | histo(source, 'max
    )

alt.hconcat(
    combi('locations', locations), combi('names', names), combi('places', places)
).properties(
    title='Binned Bubble plots and corresponding histograms comparing the correlation be
).configure_title(orient='top', anchor='middle')
```



What are all visual mappings used?

For each pleiades dataset,

binned bubble plot

x position: minDate (grouped and sorted according to the group)

y position: maxDate (grouped and sorted according to the group)

tooltip: count of records

Given that date is minDate or maxDate

histogram

x position: date (grouped and sorted according to the group)

y position: count of records

color: date (grouped and sorted according to the group)

tooltip: count of records

Was there any special data preparation done?

For each dataset, the data has been grouped to match the pleaides README on `timePeriods` such that the records fall into the following bins "*...*'*A*' *(1000-550 BC),* '*C*' *(550-330 BC),* '*H*' *(330-30 BC),* '*R*' *(AD 30-300),* '*L*' *(AD 300-640)*".

What are the limitations of your design?

The size scale could be more carefully chosen for better visibility of all bubbles, especially those on the smaller end of the spectrum. Then, for easier, quicker comparisons between each chart, each bubble could be overlay with the count of records it represent as opposed to relying for tooltips. The charts could also be organised and sized such that for each bubble plot, the corresponding `minDate` histogram is below it and the `maxDate` histogram is 'turned' on its left side and places to the left of the bubble plot and the scales line up.

Visualization 4

What can we learn from the visualization?

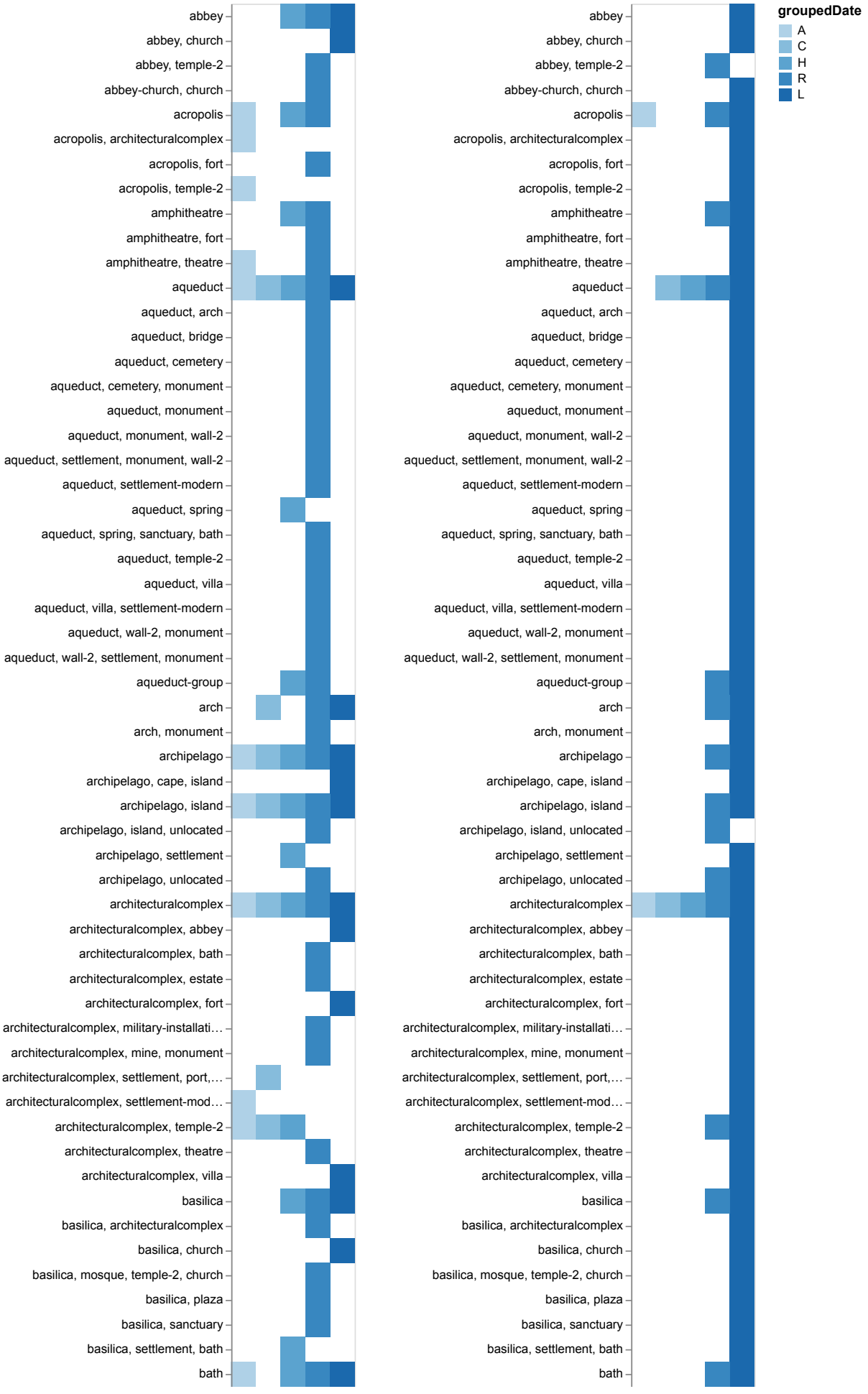
To understand the distribution of the `timePeriods` within which points of interest were founded and dissolved.

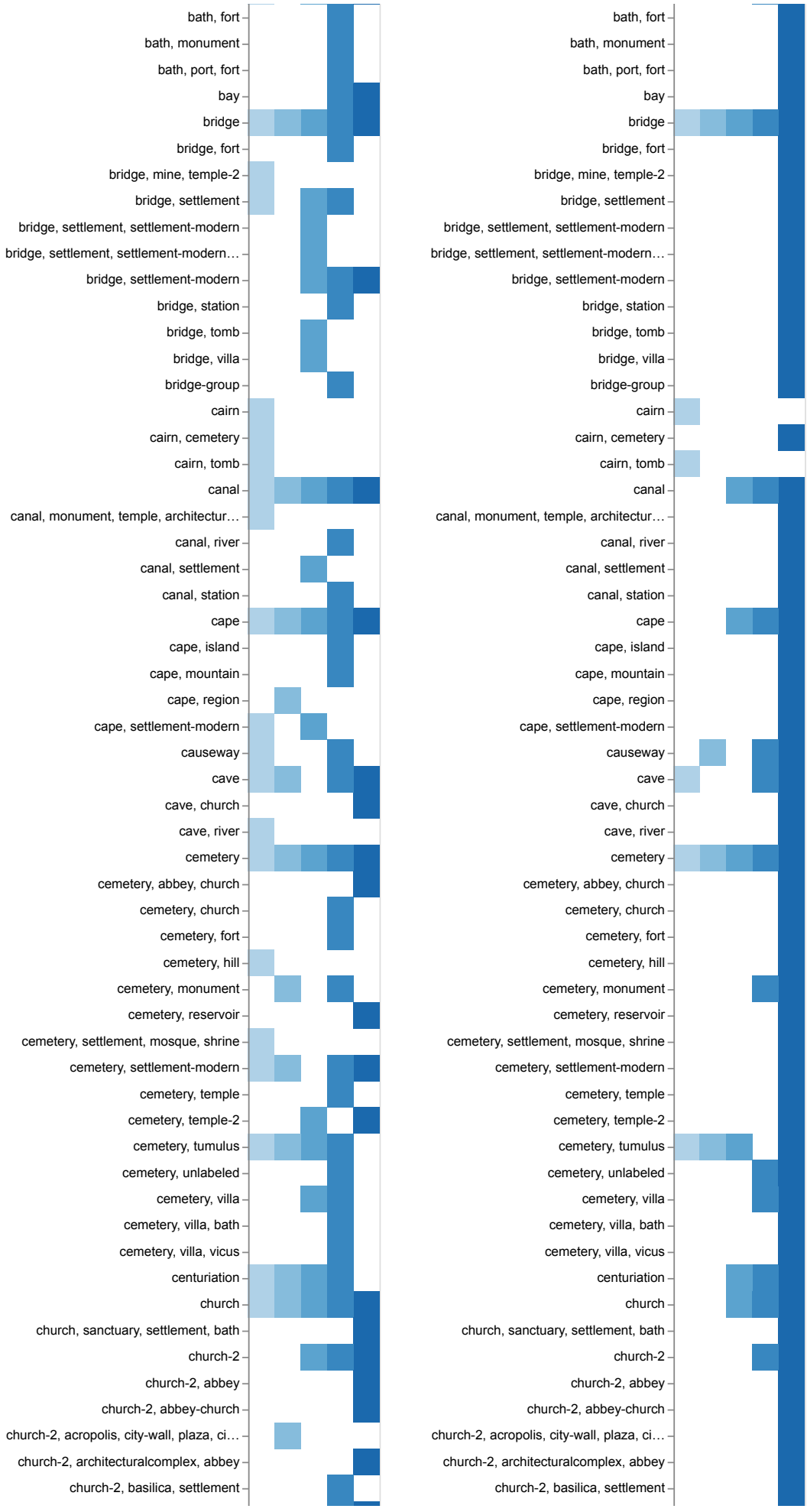
What is the name for the type of visualization(s) used?

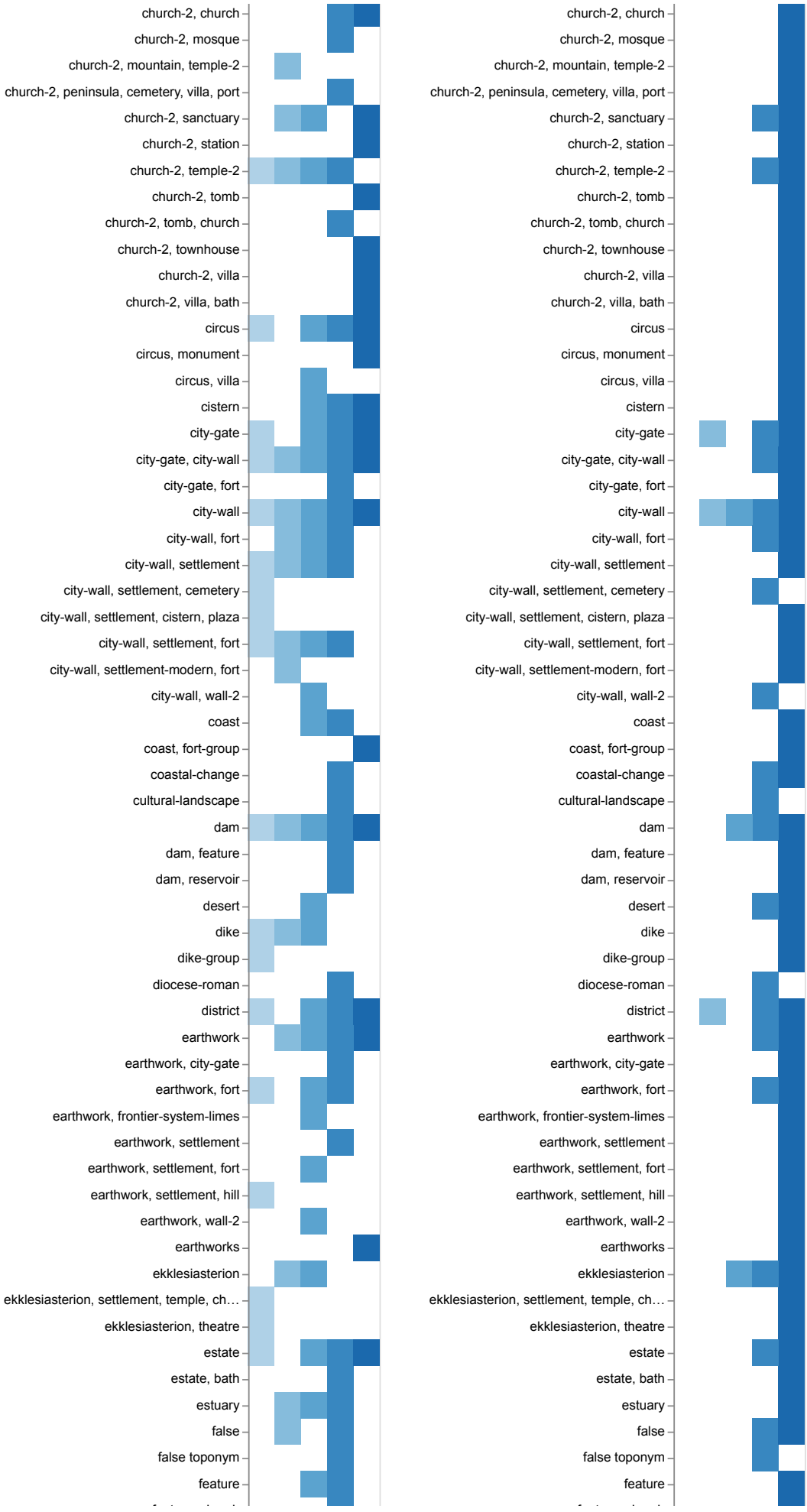
Heatmap

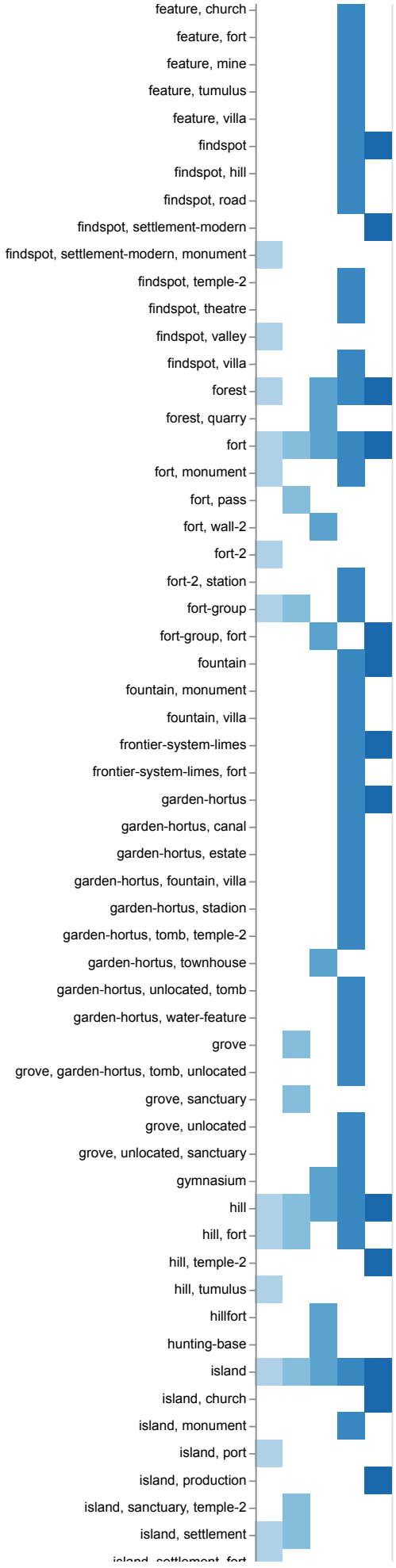
```
import altair as alt

places = ('https://raw.githubusercontent.com/SwanseaU-TTW/csc337_coursework1/master/ple

def heatMap(column):
    return (
        alt.Chart(places).mark_rect().transform_calculate(
            groupedDate=f'datum.{column} < -550 ? "A" : datum.{column} < -330 ? "C" : da
        ).encode(
            alt.X("groupedDate:O", sort=['A', 'C', 'H', 'R', 'L'], title=f'{column}(grou
            y='featureTypes:N',
            color=alt.Color('groupedDate:O', sort=['A', 'C', 'H', 'R', 'L']),
            tooltip=['count()']
        )
    )


alt.hconcat(
    (heatMap('minDate') | heatMap('maxDate'))
).properties(
    title='Heatmaps showing what featureTypes have a minDate and maxDate in what timePe
).configure_title(orient='top', anchor='middle')
```

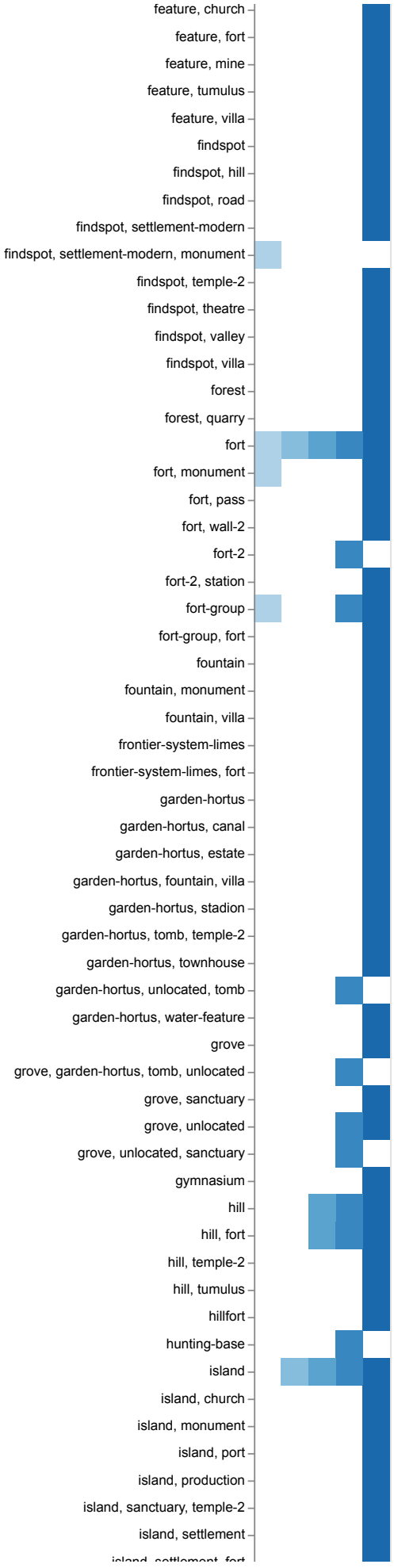
Heatmaps showing what featureTypes have a minDate and maxDate in what timePeriods for each record on the places pleiades dataset

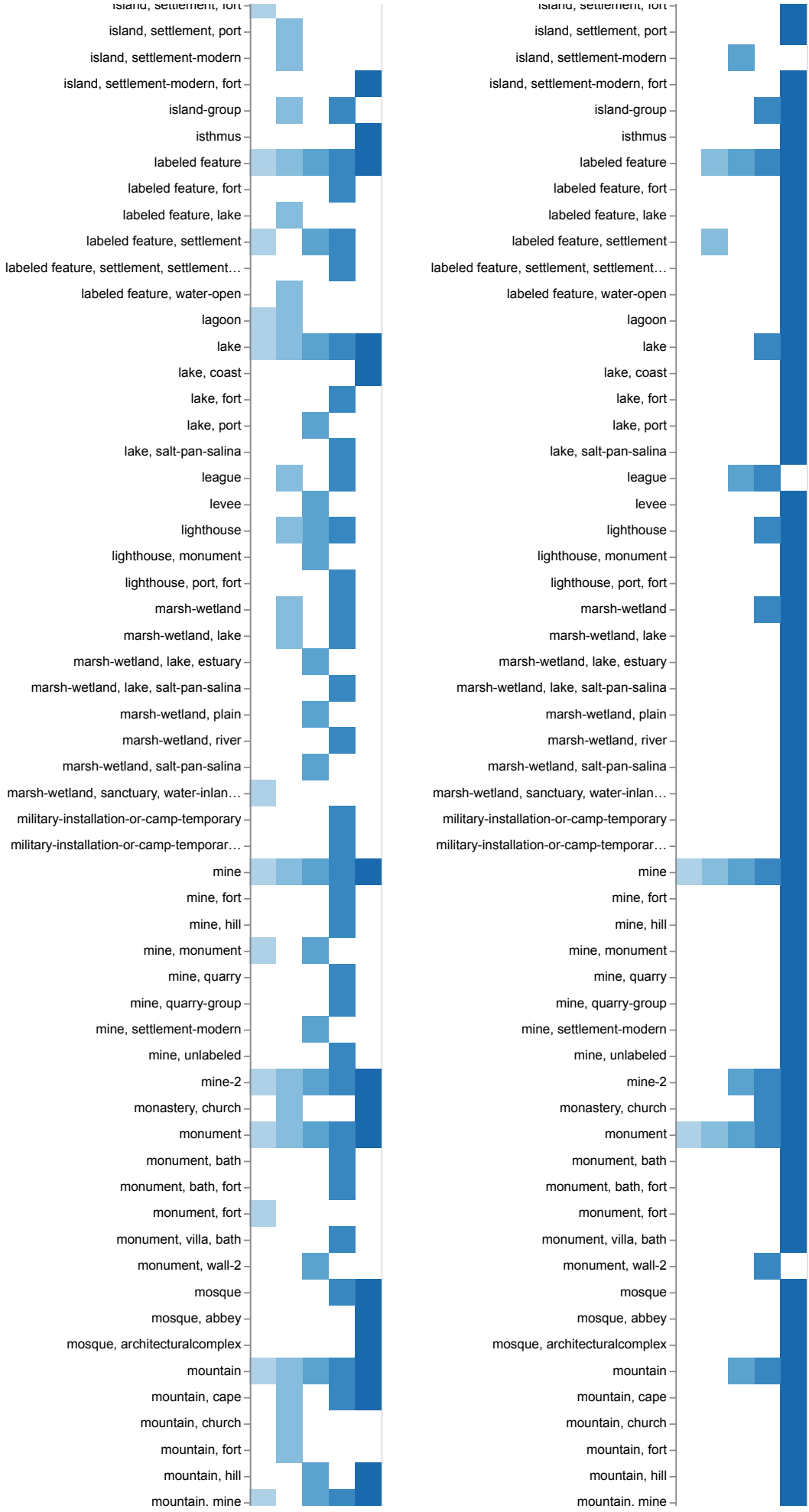


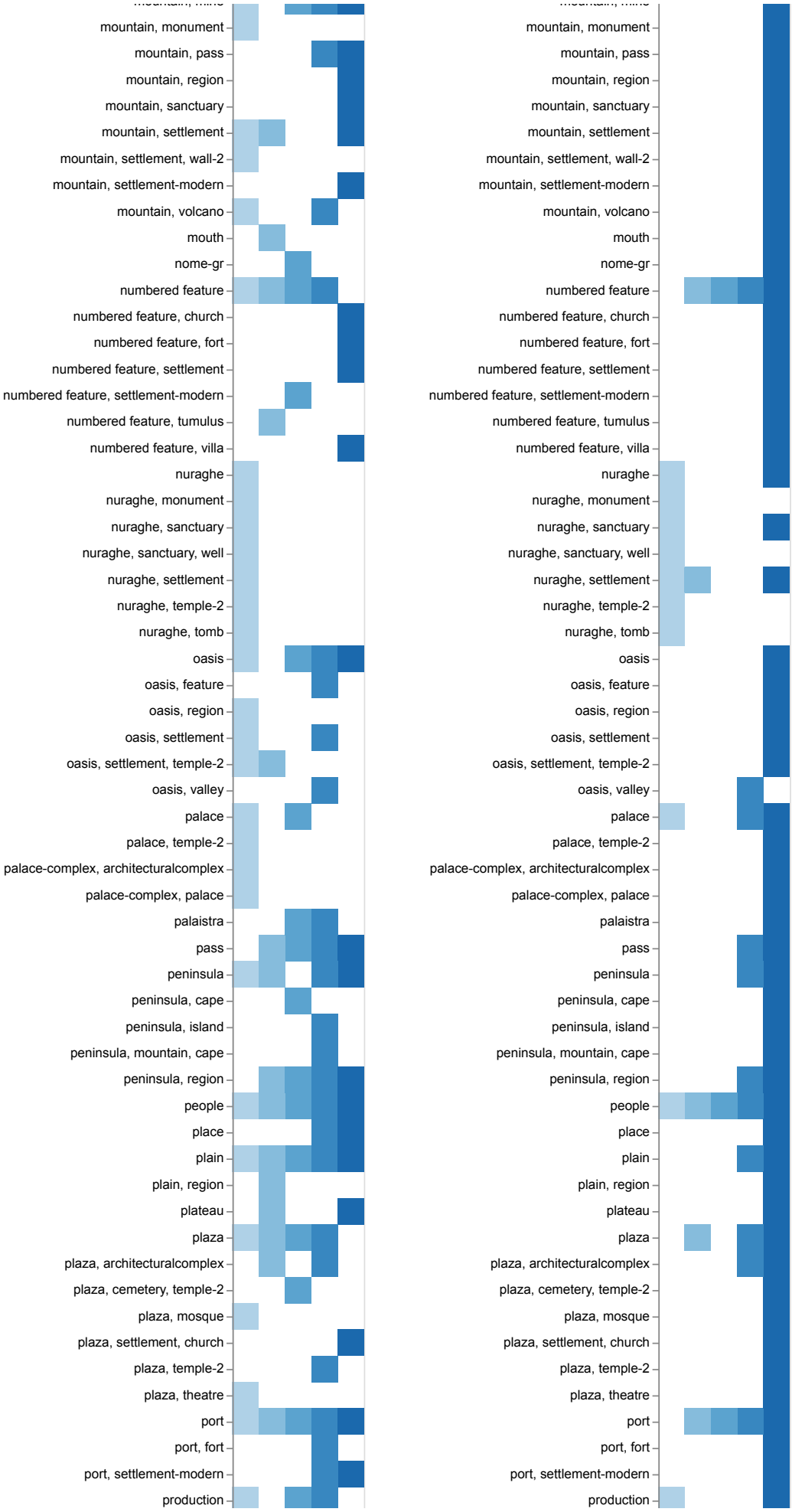

bath, fort
bath, monument
bath, port, fort
bay
bridge
bridge, fort
bridge, mine, temple-2
bridge, settlement
bridge, settlement, settlement-modern
bridge, settlement, settlement-modern…
bridge, settlement-modern
bridge, station
bridge, tomb
bridge, villa
bridge-group
cairn
cairn, cemetery
cairn, tomb
canal
canal, monument, temple, architectur…
canal, river
canal, settlement
canal, station
cape
cape, island
cape, mountain
cape, region
cape, settlement-modern
causeway
cave
cave, church
cave, river
cemetery
cemetery, abbey, church
cemetery, church
cemetery, fort
cemetery, hill
cemetery, monument
cemetery, reservoir
cemetery, settlement, mosque, shrine
cemetery, settlement-modern
cemetery, temple
cemetery, temple-2
cemetery, tumulus
cemetery, unlabeled
cemetery, villa
cemetery, villa, bath
cemetery, villa, vicus
centuriation
church
church, sanctuary, settlement, bath
church-2
church-2, abbey
church-2, abbey-church
church-2, acropolis, city-wall, plaza, ci…
church-2, architecturalcomplex, abbey
church-2, basilica, settlement

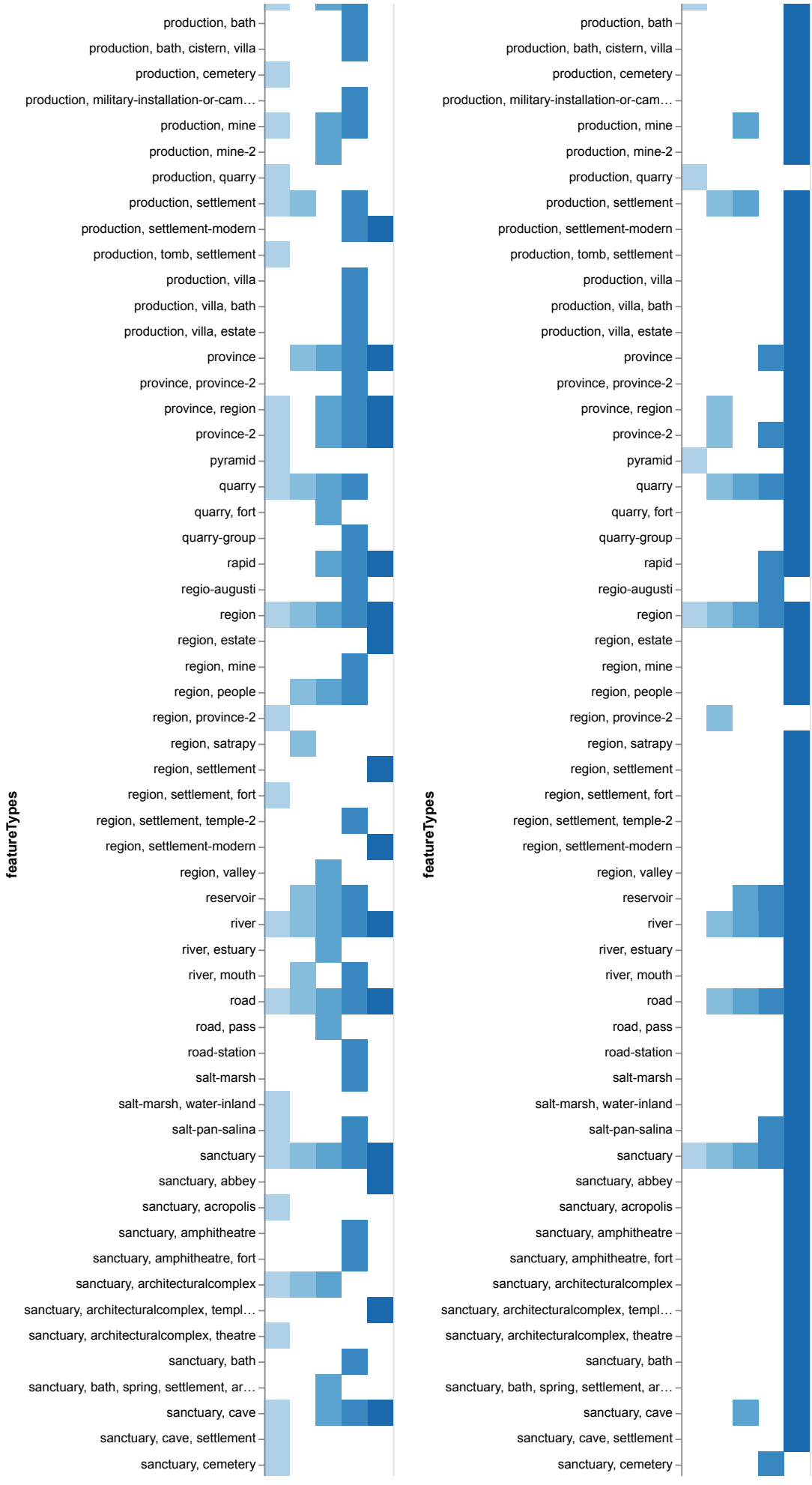

church-2, church
church-2, mosque
church-2, mountain, temple-2
church-2, peninsula, cemetery, villa, port
church-2, sanctuary
church-2, station
church-2, temple-2
church-2, tomb
church-2, tomb, church
church-2, townhouse
church-2, villa
church-2, villa, bath
circus
circus, monument
circus, villa
cistern
city-gate
city-gate, city-wall
city-gate, fort
city-wall
city-wall, fort
city-wall, settlement
city-wall, settlement, cemetery
city-wall, settlement, cistern, plaza
city-wall, settlement, fort
city-wall, settlement-modern, fort
city-wall, wall-2
coast
coast, fort-group
coastal-change
cultural-landscape
dam
dam, feature
dam, reservoir
desert
dike
dike-group
diocese-roman
district
earthwork
earthwork, city-gate
earthwork, fort
earthwork, frontier-system-limes
earthwork, settlement
earthwork, settlement, fort
earthwork, settlement, hill
earthwork, wall-2
earthworks
ekklesiasterion
ekklesiasterion, settlement, temple, ch…
ekklesiasterion, theatre
estate
estate, bath
estuary
false
false toponym
feature

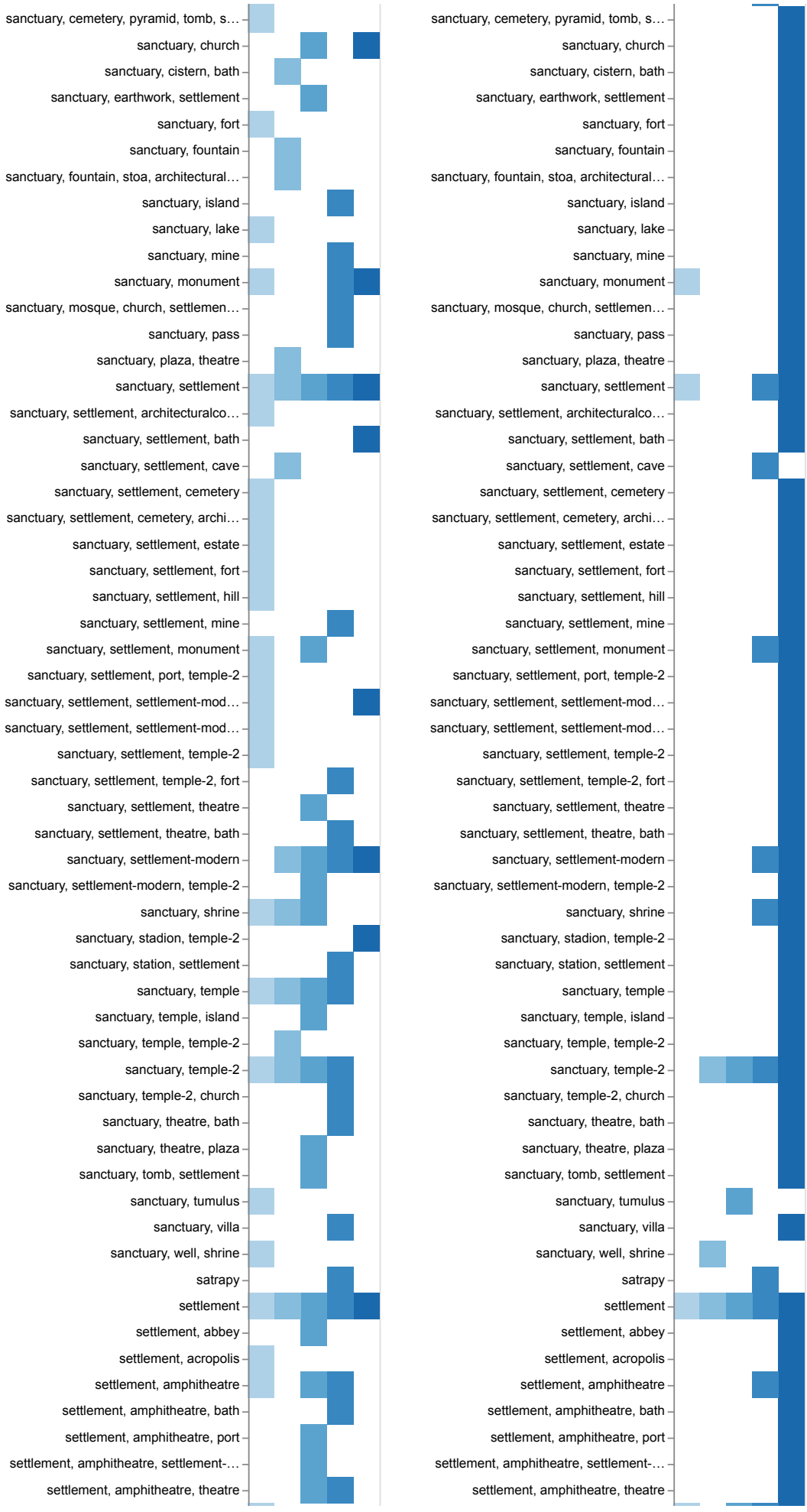

feature, church
feature, fort
feature, mine
feature, tumulus
feature, villa
findspot
findspot, hill
findspot, road
findspot, settlement-modern
findspot, settlement-modern, monument
findspot, temple-2
findspot, theatre
findspot, valley
findspot, villa
forest
forest, quarry
fort
fort, monument
fort, pass
fort, wall-2
fort-2
fort-2, station
fort-group
fort-group, fort
fountain
fountain, monument
fountain, villa
frontier-system-limes
frontier-system-limes, fort
garden-hortus
garden-hortus, canal
garden-hortus, estate
garden-hortus, fountain, villa
garden-hortus, stadion
garden-hortus, tomb, temple-2
garden-hortus, townhouse
garden-hortus, unlocated, tomb
garden-hortus, water-feature
grove
grove, garden-hortus, tomb, unlocated
grove, sanctuary
grove, unlocated
grove, unlocated, sanctuary
gymnasium
hill
hill, fort
hill, temple-2
hill, tumulus
hillfort
hunting-base
island
island, church
island, monument
island, port
island, production
island, sanctuary, temple-2
island, settlement

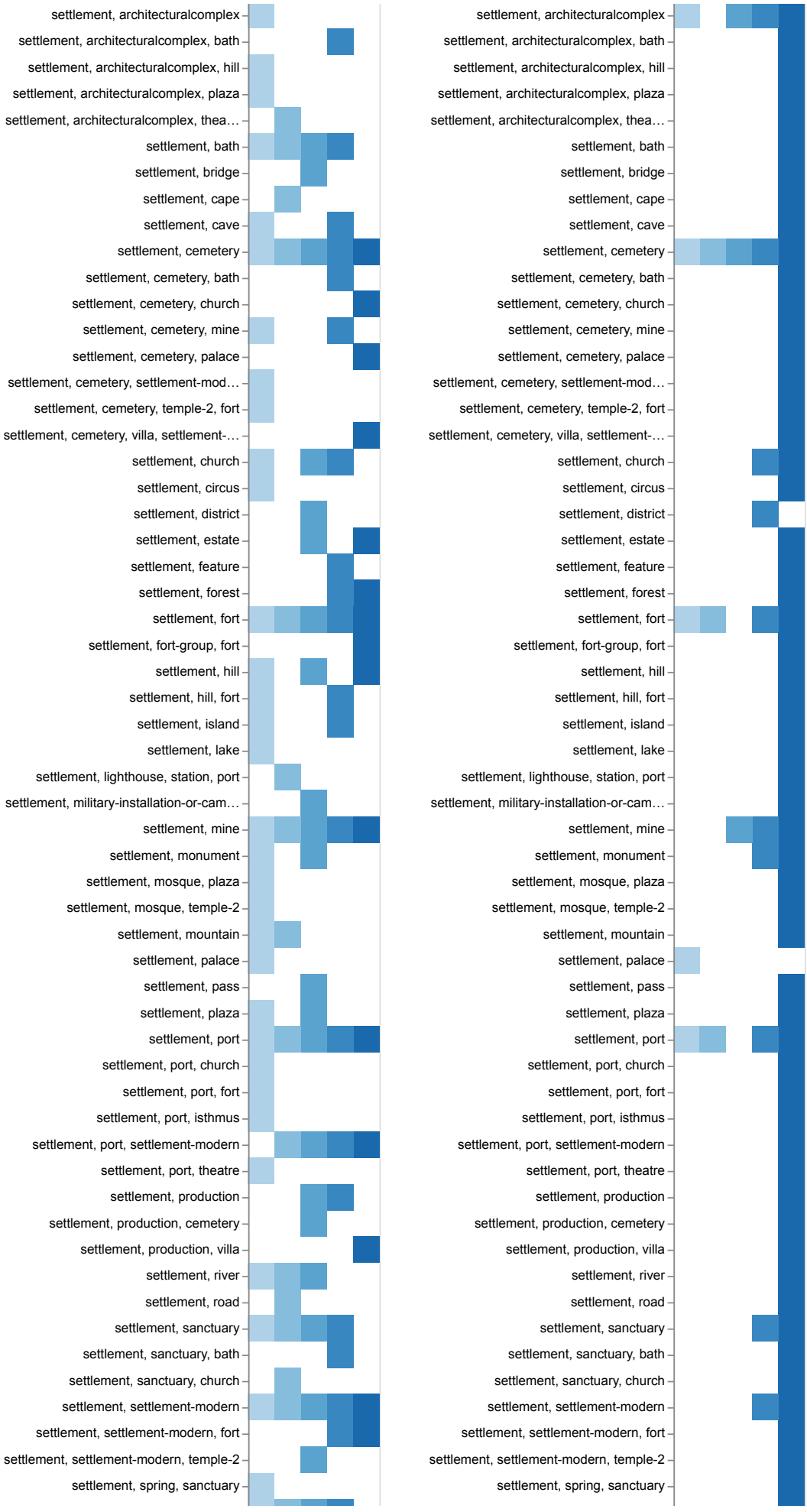

feature, church
feature, fort
feature, mine
feature, tumulus
feature, villa
findspot
findspot, hill
findspot, road
findspot, settlement-modern
findspot, settlement-modern, monument
findspot, temple-2
findspot, theatre
findspot, valley
findspot, villa
forest
forest, quarry
fort
fort, monument
fort, pass
fort, wall-2
fort-2
fort-2, station
fort-group
fort-group, fort
fountain
fountain, monument
fountain, villa
frontier-system-limes
frontier-system-limes, fort
garden-hortus
garden-hortus, canal
garden-hortus, estate
garden-hortus, fountain, villa
garden-hortus, stadion
garden-hortus, tomb, temple-2
garden-hortus, townhouse
garden-hortus, unlocated, tomb
garden-hortus, water-feature
grove
grove, garden-hortus, tomb, unlocated
grove, sanctuary
grove, unlocated
grove, unlocated, sanctuary
gymnasium
hill
hill, fort
hill, temple-2
hill, tumulus
hillfort
hunting-base
island
island, church
island, monument
island, port
island, production
island, sanctuary, temple-2
island, settlement

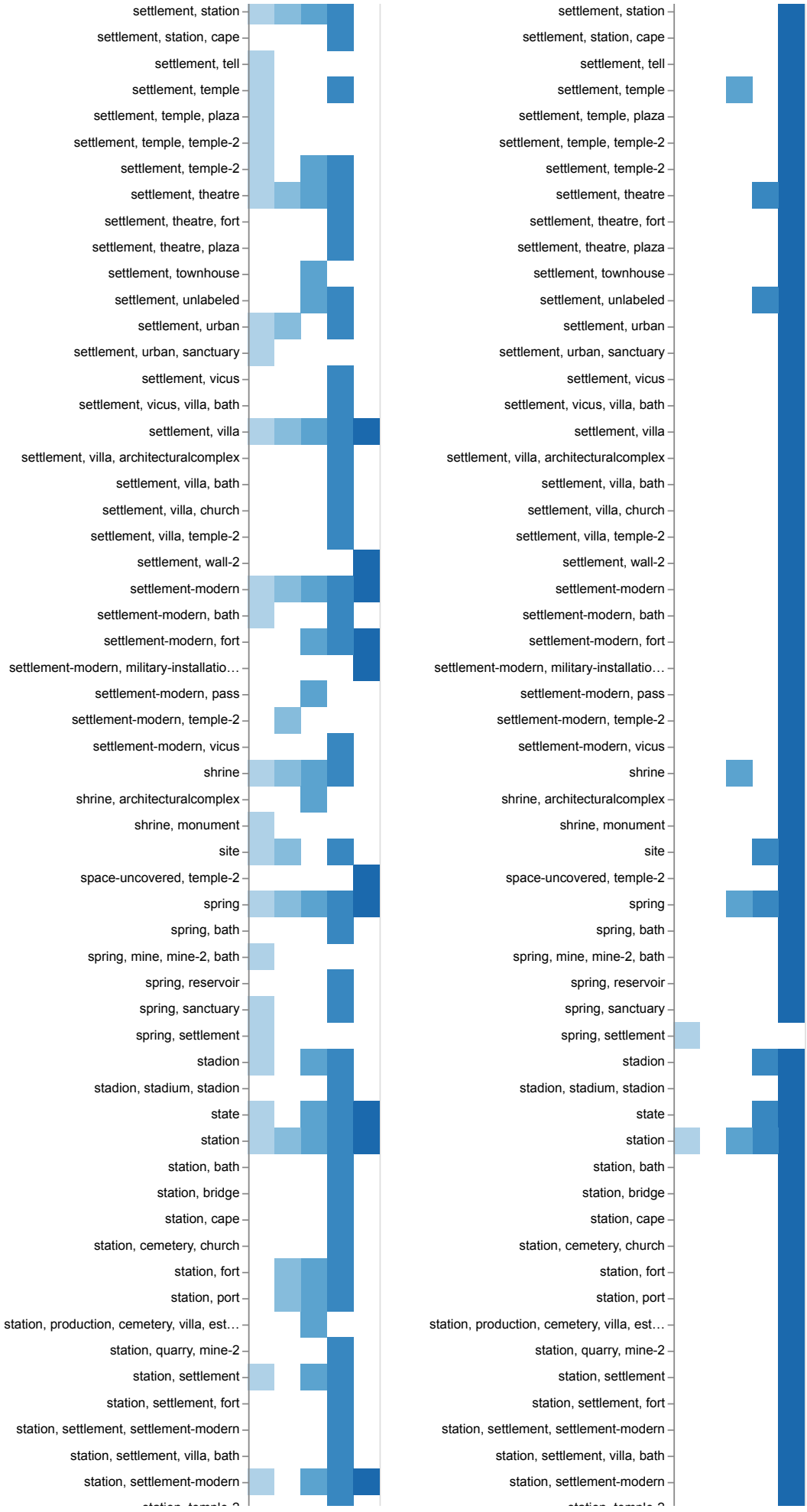

island, settlement, port
island, settlement-modern
island, settlement-modern, fort
island-group
isthmus
labeled feature
labeled feature, fort
labeled feature, lake
labeled feature, settlement
labeled feature, settlement, settlement…
labeled feature, water-open
lagoon
lake
lake, coast
lake, fort
lake, port
lake, salt-pan-salina
league
levee
lighthouse
lighthouse, monument
lighthouse, port, fort
marsh-wetland
marsh-wetland, lake
marsh-wetland, lake, estuary
marsh-wetland, lake, salt-pan-salina
marsh-wetland, plain
marsh-wetland, river
marsh-wetland, salt-pan-salina
marsh-wetland, sanctuary, water-inlan…
military-installation-or-camp-temporary
military-installation-or-camp-temporar…
mine
mine, fort
mine, hill
mine, monument
mine, quarry
mine, quarry-group
mine, settlement-modern
mine, unlabeled
mine-2
monastery, church
monument
monument, bath
monument, bath, fort
monument, fort
monument, villa, bath
monument, wall-2
mosque
mosque, abbey
mosque, architecturalcomplex
mountain
mountain, cape
mountain, church
mountain, fort
mountain, hill
mountain. mine

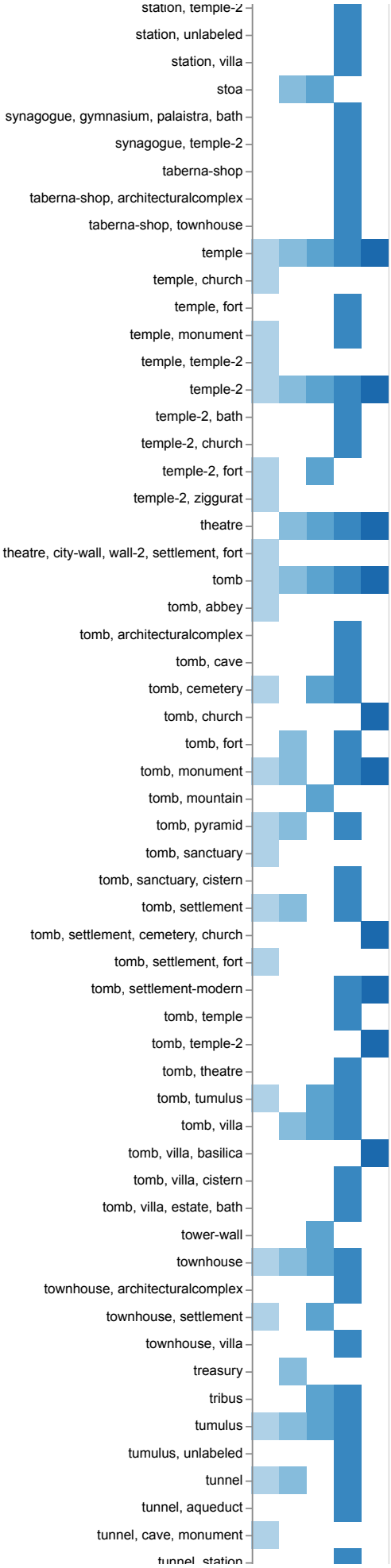

mountain, monument
mountain, pass
mountain, region
mountain, sanctuary
mountain, settlement
mountain, settlement, wall-2
mountain, settlement-modern
mountain, volcano
mouth
nome-gr
numbered feature
numbered feature, church
numbered feature, fort
numbered feature, settlement
numbered feature, settlement-modern
numbered feature, tumulus
numbered feature, villa
nuraghe
nuraghe, monument
nuraghe, sanctuary
nuraghe, sanctuary, well
nuraghe, settlement
nuraghe, temple-2
nuraghe, tomb
oasis
oasis, feature
oasis, region
oasis, settlement
oasis, settlement, temple-2
oasis, valley
palace
palace, temple-2
palace-complex, architecturalcomplex
palace-complex, palace
palaistra
pass
peninsula
peninsula, cape
peninsula, island
peninsula, mountain, cape
peninsula, region
people
place
plain
plain, region
plateau
plaza
plaza, architecturalcomplex
plaza, cemetery, temple-2
plaza, mosque
plaza, settlement, church
plaza, temple-2
plaza, theatre
port
port, fort
port, settlement-modern
production

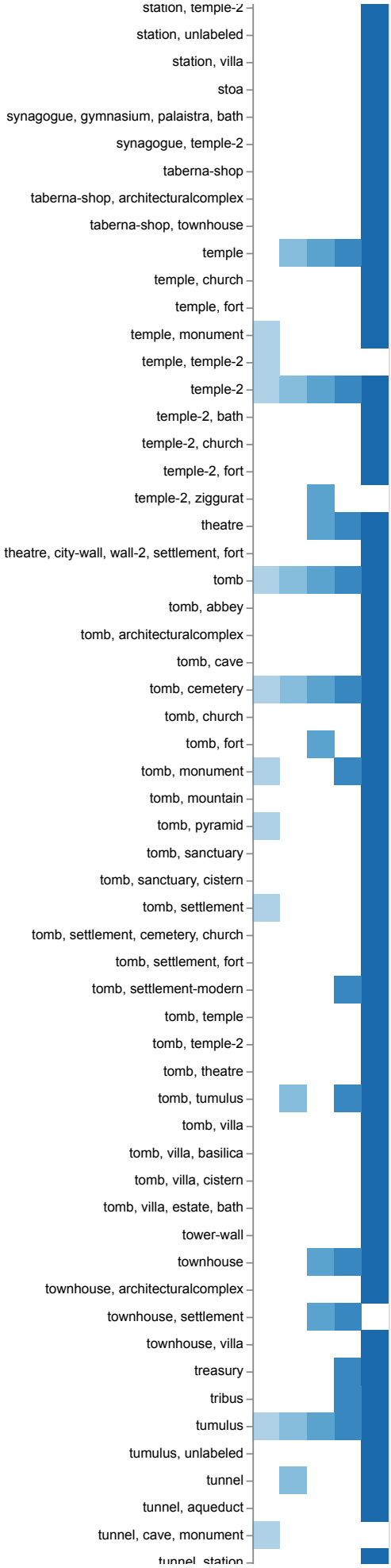

featureTypes
production, bath
production, bath, cistern, villa
production, cemetery
production, military-installation-or-cam…
production, mine
production, mine-2
production, quarry
production, settlement
production, settlement-modern
production, tomb, settlement
production, villa
production, villa, bath
production, villa, estate
province
province, province-2
province, region
province-2
pyramid
quarry
quarry, fort
quarry-group
rapid
regio-augusti
region
region, estate
region, mine
region, people
region, province-2
region, satrapy
region, settlement
region, settlement, fort
region, settlement, temple-2
region, settlement-modern
region, valley
reservoir
river
river, estuary
river, mouth
road
road, pass
road-station
salt-marsh
salt-marsh, water-inland
salt-pan-salina
sanctuary
sanctuary, abbey
sanctuary, acropolis
sanctuary, amphitheatre
sanctuary, amphitheatre, fort
sanctuary, architecturalcomplex
sanctuary, architecturalcomplex, templ…
sanctuary, architecturalcomplex, theatre
sanctuary, bath
sanctuary, bath, spring, settlement, ar…
sanctuary, cave
sanctuary, cave, settlement
sanctuary, cemetery
featureTypes
production, bath
production, bath, cistern, villa
production, cemetery
production, military-installation-or-cam…
production, mine
production, mine-2
production, quarry
production, settlement
production, settlement-modern
production, tomb, settlement
production, villa
production, villa, bath
production, villa, estate
province
province, province-2
province, region
province-2
pyramid
quarry
quarry, fort
quarry-group
rapid
regio-augusti
region
region, estate
region, mine
region, people
region, province-2
region, satrapy
region, settlement
region, settlement, fort
region, settlement, temple-2
region, settlement-modern
region, valley
reservoir
river
river, estuary
river, mouth
road
road, pass
road-station
salt-marsh
salt-marsh, water-inland
salt-pan-salina
sanctuary
sanctuary, abbey
sanctuary, acropolis
sanctuary, amphitheatre
sanctuary, amphitheatre, fort
sanctuary, architecturalcomplex
sanctuary, architecturalcomplex, templ…
sanctuary, architecturalcomplex, theatre
sanctuary, bath
sanctuary, bath, spring, settlement, ar…
sanctuary, cave
sanctuary, cave, settlement
sanctuary, cemetery

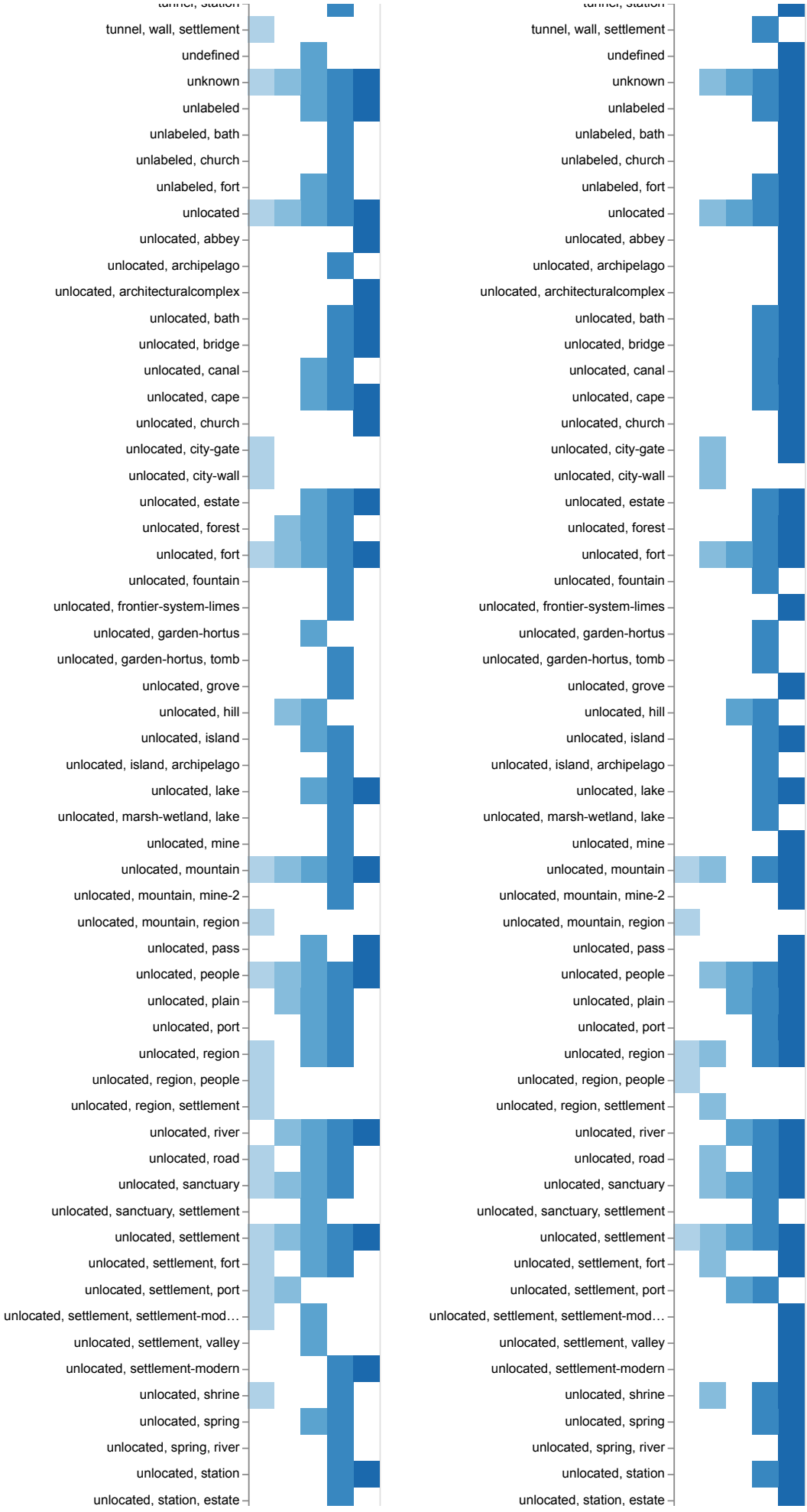

sanctuary, cemetery, pyramid, tomb, s…
sanctuary, church
sanctuary, cistern, bath
sanctuary, earthwork, settlement
sanctuary, fort
sanctuary, fountain
sanctuary, fountain, stoa, architectural…
sanctuary, island
sanctuary, lake
sanctuary, mine
sanctuary, monument
sanctuary, mosque, church, settlemen…
sanctuary, pass
sanctuary, plaza, theatre
sanctuary, settlement
sanctuary, settlement, architecturalco…
sanctuary, settlement, bath
sanctuary, settlement, cave
sanctuary, settlement, cemetery
sanctuary, settlement, cemetery, archi…
sanctuary, settlement, estate
sanctuary, settlement, fort
sanctuary, settlement, hill
sanctuary, settlement, mine
sanctuary, settlement, monument
sanctuary, settlement, port, temple-2
sanctuary, settlement, settlement-mod…
sanctuary, settlement, settlement-mod…
sanctuary, settlement, temple-2
sanctuary, settlement, temple-2, fort
sanctuary, settlement, theatre
sanctuary, settlement, theatre, bath
sanctuary, settlement-modern
sanctuary, settlement-modern, temple-2
sanctuary, shrine
sanctuary, stadion, temple-2
sanctuary, station, settlement
sanctuary, temple
sanctuary, temple, island
sanctuary, temple, temple-2
sanctuary, temple-2
sanctuary, temple-2, church
sanctuary, theatre, bath
sanctuary, theatre, plaza
sanctuary, tomb, settlement
sanctuary, tumulus
sanctuary, villa
sanctuary, well, shrine
satrapy
settlement
settlement, abbey
settlement, acropolis
settlement, amphitheatre
settlement, amphitheatre, bath
settlement, amphitheatre, port
settlement, amphitheatre, settlement-…
settlement, amphitheatre, theatre
sanctuary, cemetery, pyramid, tomb, s…
sanctuary, church
sanctuary, cistern, bath
sanctuary, earthwork, settlement
sanctuary, fort
sanctuary, fountain
sanctuary, fountain, stoa, architectural…
sanctuary, island
sanctuary, lake
sanctuary, mine
sanctuary, monument
sanctuary, mosque, church, settlemen…
sanctuary, pass
sanctuary, plaza, theatre
sanctuary, settlement
sanctuary, settlement, architecturalco…
sanctuary, settlement, bath
sanctuary, settlement, cave
sanctuary, settlement, cemetery
sanctuary, settlement, cemetery, archi…
sanctuary, settlement, estate
sanctuary, settlement, fort
sanctuary, settlement, hill
sanctuary, settlement, mine
sanctuary, settlement, monument
sanctuary, settlement, port, temple-2
sanctuary, settlement, settlement-mod…
sanctuary, settlement, settlement-mod…
sanctuary, settlement, temple-2
sanctuary, settlement, temple-2, fort
sanctuary, settlement, theatre
sanctuary, settlement, theatre, bath
sanctuary, settlement-modern
sanctuary, settlement-modern, temple-2
sanctuary, shrine
sanctuary, stadion, temple-2
sanctuary, station, settlement
sanctuary, temple
sanctuary, temple, island
sanctuary, temple, temple-2
sanctuary, temple-2
sanctuary, temple-2, church
sanctuary, theatre, bath
sanctuary, theatre, plaza
sanctuary, tomb, settlement
sanctuary, tumulus
sanctuary, villa
sanctuary, well, shrine
satrapy
settlement
settlement, abbey
settlement, acropolis
settlement, amphitheatre
settlement, amphitheatre, bath
settlement, amphitheatre, port
settlement, amphitheatre, settlement-…
settlement, amphitheatre, theatre

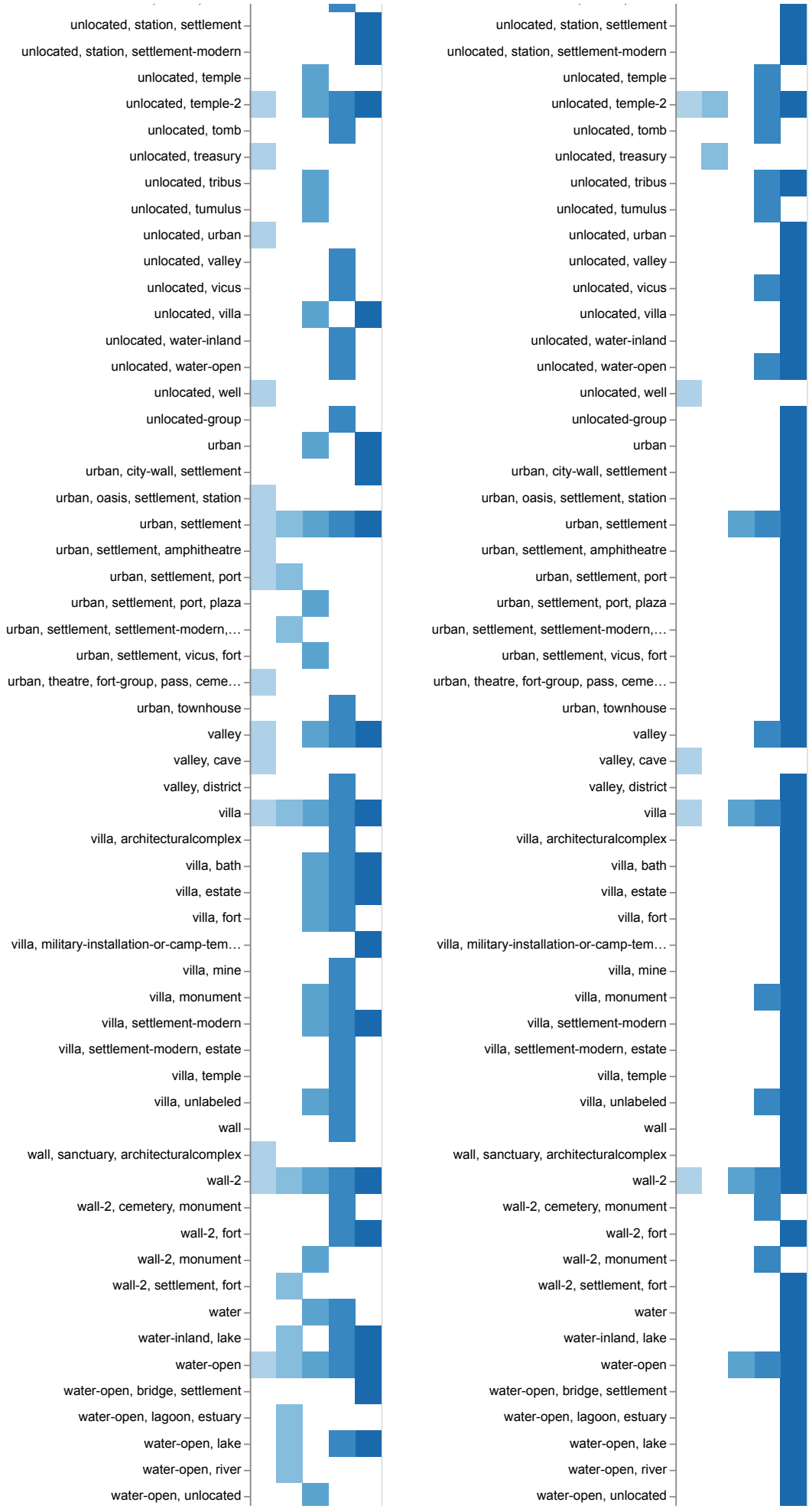

settlement, architecturalcomplex
settlement, architecturalcomplex, bath
settlement, architecturalcomplex, hill
settlement, architecturalcomplex, plaza
settlement, architecturalcomplex, thea…
settlement, bath
settlement, bridge
settlement, cape
settlement, cave
settlement, cemetery
settlement, cemetery, bath
settlement, cemetery, church
settlement, cemetery, mine
settlement, cemetery, palace
settlement, cemetery, settlement-mod…
settlement, cemetery, temple-2, fort
settlement, cemetery, villa, settlement-…
settlement, church
settlement, circus
settlement, district
settlement, estate
settlement, feature
settlement, forest
settlement, fort
settlement, fort-group, fort
settlement, hill
settlement, hill, fort
settlement, island
settlement, lake
settlement, lighthouse, station, port
settlement, military-installation-or-cam…
settlement, mine
settlement, monument
settlement, mosque, plaza
settlement, mosque, temple-2
settlement, mountain
settlement, palace
settlement, pass
settlement, plaza
settlement, port
settlement, port, church
settlement, port, fort
settlement, port, isthmus
settlement, port, settlement-modern
settlement, port, theatre
settlement, production
settlement, production, cemetery
settlement, production, villa
settlement, river
settlement, road
settlement, sanctuary
settlement, sanctuary, bath
settlement, sanctuary, church
settlement, settlement-modern
settlement, settlement-modern, fort
settlement, settlement-modern, temple-2
settlement, spring, sanctuary
settlement, architecturalcomplex
settlement, architecturalcomplex, bath
settlement, architecturalcomplex, hill
settlement, architecturalcomplex, plaza
settlement, architecturalcomplex, thea…
settlement, bath
settlement, bridge
settlement, cape
settlement, cave
settlement, cemetery
settlement, cemetery, bath
settlement, cemetery, church
settlement, cemetery, mine
settlement, cemetery, palace
settlement, cemetery, settlement-mod…
settlement, cemetery, temple-2, fort
settlement, cemetery, villa, settlement-…
settlement, church
settlement, circus
settlement, district
settlement, estate
settlement, feature
settlement, forest
settlement, fort
settlement, fort-group, fort
settlement, hill
settlement, hill, fort
settlement, island
settlement, lake
settlement, lighthouse, station, port
settlement, military-installation-or-cam…
settlement, mine
settlement, monument
settlement, mosque, plaza
settlement, mosque, temple-2
settlement, mountain
settlement, palace
settlement, pass
settlement, plaza
settlement, port
settlement, port, church
settlement, port, fort
settlement, port, isthmus
settlement, port, settlement-modern
settlement, port, theatre
settlement, production
settlement, production, cemetery
settlement, production, villa
settlement, river
settlement, road
settlement, sanctuary
settlement, sanctuary, bath
settlement, sanctuary, church
settlement, settlement-modern
settlement, settlement-modern, fort
settlement, settlement-modern, temple-2
settlement, spring, sanctuary

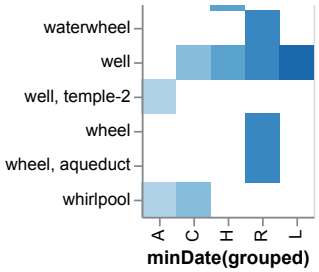

settlement, station
settlement, station, cape
settlement, tell
settlement, temple
settlement, temple, plaza
settlement, temple, temple-2
settlement, temple-2
settlement, theatre
settlement, theatre, fort
settlement, theatre, plaza
settlement, townhouse
settlement, unlabeled
settlement, urban
settlement, urban, sanctuary
settlement, vicus
settlement, vicus, villa, bath
settlement, villa
settlement, villa, architecturalcomplex
settlement, villa, bath
settlement, villa, church
settlement, villa, temple-2
settlement, wall-2
settlement-modern
settlement-modern, bath
settlement-modern, fort
settlement-modern, military-installatio…
settlement-modern, pass
settlement-modern, temple-2
settlement-modern, vicus
shrine
shrine, architecturalcomplex
shrine, monument
site
space-uncovered, temple-2
spring
spring, bath
spring, mine, mine-2, bath
spring, reservoir
spring, sanctuary
spring, settlement
stadion
stadion, stadium, stadion
state
station
station, bath
station, bridge
station, cape
station, cemetery, church
station, fort
station, port
station, production, cemetery, villa, est…
station, quarry, mine-2
station, settlement
station, settlement, fort
station, settlement, settlement-modern
station, settlement, villa, bath
station, settlement-modern
settlement, station
settlement, station, cape
settlement, tell
settlement, temple
settlement, temple, plaza
settlement, temple, temple-2
settlement, temple-2
settlement, theatre
settlement, theatre, fort
settlement, theatre, plaza
settlement, townhouse
settlement, unlabeled
settlement, urban
settlement, urban, sanctuary
settlement, vicus
settlement, vicus, villa, bath
settlement, villa
settlement, villa, architecturalcomplex
settlement, villa, bath
settlement, villa, church
settlement, villa, temple-2
settlement, wall-2
settlement-modern
settlement-modern, bath
settlement-modern, fort
settlement-modern, military-installatio…
settlement-modern, pass
settlement-modern, temple-2
settlement-modern, vicus
shrine
shrine, architecturalcomplex
shrine, monument
site
space-uncovered, temple-2
spring
spring, bath
spring, mine, mine-2, bath
spring, reservoir
spring, sanctuary
spring, settlement
stadion
stadion, stadium, stadion
state
station
station, bath
station, bridge
station, cape
station, cemetery, church
station, fort
station, port
station, production, cemetery, villa, est…
station, quarry, mine-2
station, settlement
station, settlement, fort
station, settlement, settlement-modern
station, settlement, villa, bath
station, settlement-modern

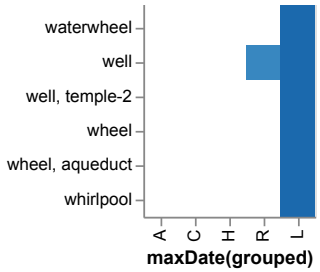

station, temple-2
station, unlabeled
station, villa
stoa
synagogue, gymnasium, palaistra, bath
synagogue, temple-2
taberna-shop
taberna-shop, architecturalcomplex
taberna-shop, townhouse
temple
temple, church
temple, fort
temple, monument
temple, temple-2
temple-2
temple-2, bath
temple-2, church
temple-2, fort
temple-2, ziggurat
theatre
theatre, city-wall, wall-2, settlement, fort
tomb
tomb, abbey
tomb, architecturalcomplex
tomb, cave
tomb, cemetery
tomb, church
tomb, fort
tomb, monument
tomb, mountain
tomb, pyramid
tomb, sanctuary
tomb, sanctuary, cistern
tomb, settlement
tomb, settlement, cemetery, church
tomb, settlement, fort
tomb, settlement-modern
tomb, temple
tomb, temple-2
tomb, theatre
tomb, tumulus
tomb, villa
tomb, villa, basilica
tomb, villa, cistern
tomb, villa, estate, bath
tower-wall
townhouse
townhouse, architecturalcomplex
townhouse, settlement
townhouse, villa
treasury
tribus
tumulus
tumulus, unlabeled
tunnel
tunnel, aqueduct
tunnel, cave, monument
tunnel, station


station, temple-2
station, unlabeled
station, villa
stoa
synagogue, gymnasium, palaistra, bath
synagogue, temple-2
taberna-shop
taberna-shop, architecturalcomplex
taberna-shop, townhouse
temple
temple, church
temple, fort
temple, monument
temple, temple-2
temple-2
temple-2, bath
temple-2, church
temple-2, fort
temple-2, ziggurat
theatre
theatre, city-wall, wall-2, settlement, fort
tomb
tomb, abbey
tomb, architecturalcomplex
tomb, cave
tomb, cemetery
tomb, church
tomb, fort
tomb, monument
tomb, mountain
tomb, pyramid
tomb, sanctuary
tomb, sanctuary, cistern
tomb, settlement
tomb, settlement, cemetery, church
tomb, settlement, fort
tomb, settlement-modern
tomb, temple
tomb, temple-2
tomb, theatre
tomb, tumulus
tomb, villa
tomb, villa, basilica
tomb, villa, cistern
tomb, villa, estate, bath
tower-wall
townhouse
townhouse, architecturalcomplex
townhouse, settlement
townhouse, villa
treasury
tribus
tumulus
tumulus, unlabeled
tunnel
tunnel, aqueduct
tunnel, cave, monument
tunnel, station


tunnel, wall, settlement
undefined
unknown
unlabeled
unlabeled, bath
unlabeled, church
unlabeled, fort
unlocated
unlocated, abbey
unlocated, archipelago
unlocated, architecturalcomplex
unlocated, bath
unlocated, bridge
unlocated, canal
unlocated, cape
unlocated, church
unlocated, city-gate
unlocated, city-wall
unlocated, estate
unlocated, forest
unlocated, fort
unlocated, fountain
unlocated, frontier-system-limes
unlocated, garden-hortus
unlocated, garden-hortus, tomb
unlocated, grove
unlocated, hill
unlocated, island
unlocated, island, archipelago
unlocated, lake
unlocated, marsh-wetland, lake
unlocated, mine
unlocated, mountain
unlocated, mountain, mine-2
unlocated, mountain, region
unlocated, pass
unlocated, people
unlocated, plain
unlocated, port
unlocated, region
unlocated, region, people
unlocated, region, settlement
unlocated, river
unlocated, road
unlocated, sanctuary
unlocated, sanctuary, settlement
unlocated, settlement
unlocated, settlement, fort
unlocated, settlement, port
unlocated, settlement, settlement-mod…
unlocated, settlement, valley
unlocated, settlement-modern
unlocated, shrine
unlocated, spring
unlocated, spring, river
unlocated, station
unlocated, station, estate


unlocated, station, settlement
unlocated, station, settlement-modern
unlocated, temple
unlocated, temple-2
unlocated, tomb
unlocated, treasury
unlocated, tribus
unlocated, tumulus
unlocated, urban
unlocated, valley
unlocated, vicus
unlocated, villa
unlocated, water-inland
unlocated, water-open
unlocated, well
unlocated-group
urban
urban, city-wall, settlement
urban, oasis, settlement, station
urban, settlement
urban, settlement, amphitheatre
urban, settlement, port
urban, settlement, port, plaza
urban, settlement, settlement-modern,…
urban, settlement, vicus, fort
urban, theatre, fort-group, pass, ceme…
urban, townhouse
valley
valley, cave
valley, district
villa
villa, architecturalcomplex
villa, bath
villa, estate
villa, fort
villa, military-installation-or-camp-tem…
villa, mine
villa, monument
villa, settlement-modern
villa, settlement-modern, estate
villa, temple
villa, unlabeled
wall
wall, sanctuary, architecturalcomplex
wall-2
wall-2, cemetery, monument
wall-2, fort
wall-2, monument
wall-2, settlement, fort
water
water-inland, lake
water-open
water-open, bridge, settlement
water-open, lagoon, estuary
water-open, lake
water-open, river
water-open, unlocated





What are all visual mappings used?

Given that date is minDate or maxDate

x position

date (grouped and sorted according to the group)

y position

featureTypes

color

date (grouped and sorted according to the group)

tooltip

count of records

Was there any special data preparation done?

The data has been grouped to match the pleaides README on `timePeriods` such that the records fall into the following bins "*...'A' (1000-550 BC), 'C' (550-330 BC), 'H' (330-30 BC), 'R' (AD 30-300), 'L' (AD 300-640)*".

What are the limitations of your design?

The visualization takes up to much space. This could be improved by using a smaller sample size or possibly, grouping the `featureTypes` into a smaller list of sub-categories such that its records are easier to see at a glance. Data processing to split the `featureTypes` column by the delimeter could also help.

Visualization 5

What can we learn from the visualization?

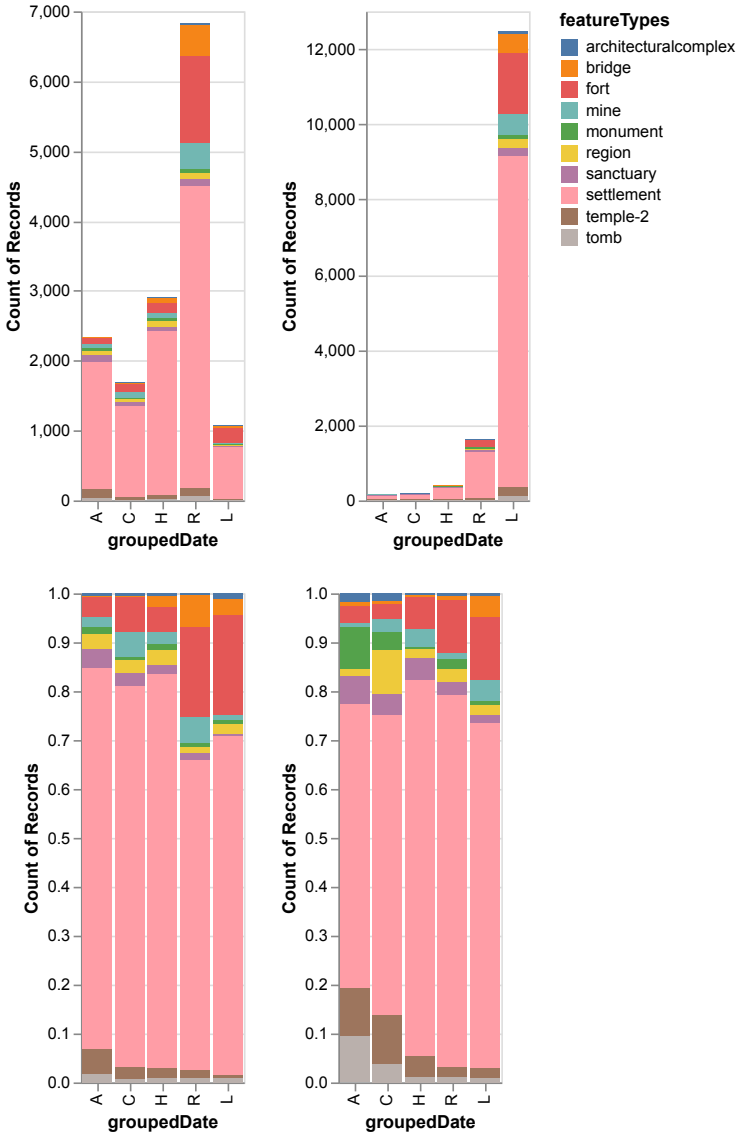
To understand how features that existed in every time period are distributed throughout those time periods

What is the name for the type of visualization(s) used?

Stacked and normalized stacked bar charts

```
import altair as alt

places = ('https://raw.githubusercontent.com/SwanseaU-TTW/csc337_coursework1/master/ple

popularFeatureTypes = ['settlement', 'architecturalcomplex', 'fort', 'temple-2', 'bridg

def stackedBarChart(column):
    return (
        alt.Chart(places).transform_calculate(
            groupedDate=f'datum.{column} < -550 ? "A" : datum.{column} < -330 ? "C" : da
        ).mark_bar().encode(
            alt.X("groupedDate:O", sort=['A', 'C', 'H', 'R', 'L']),
            alt.Y('count()'),
            color='featureTypes:N',
            tooltip=['groupedDate:N', 'featureTypes:N', 'count()']
        ).transform_filter(
            alt.FieldOneOfPredicate(field='featureTypes', oneOf=popularFeatureTypes),
        ).interactive()
    )

alt.vconcat(
    alt.hconcat(
        stackedBarChart('minDate'),
        stackedBarChart('maxDate')
    ),
    alt.hconcat(
        stackedBarChart('minDate').encode(alt.Y('count()', stack='normalize')),
        stackedBarChart('maxDate').encode(alt.Y('count()', stack='normalize'))
    )
).properties(
    title='Stacked bar charts and corresponding normalized stacked bar charts showing po
).configure_title(orient='top', anchor='middle')
```

Stacked bar charts and corresponding normalized stacked bar charts showing popular features' minDate and maxDate within each time period



What are all visual mappings used?

Given that date is minDate or maxDate

x position

date (grouped and sorted according to the group)

y position

count of records

color

featureTypes

tooltip

date (grouped), featureTypes, count of each featureType

Was there any special data preparation done?

The data has been grouped to match the pleaides README on `timePeriods` such that the records fall into the following bins "*...'A' (1000-550 BC), 'C' (550-330 BC), 'H' (330-30 BC), 'R' (AD 30-300), 'L' (AD 300-640)*". The data has also been filtered such that only a subset of `featureTypes` that are known to exist across all `timePeriods` are observed.

What are the limitations of your design?

This visualization could be improved by allowing users the ability to zoom into the chart. This visualization could be improved by randomly choosing what `featureTypes` to observe. Better still, improvements could be made by dynamically choosing what records to observe depending verious criteria, especially across the identified `timePeriods` . Further, input elements such as checkboxes, dropdowns and/or radio buttons could be used to allow dynamical selection of what criteria is used on the visualization.