

Evaluation Method of Heat Island Intensity for Coastal Urban Area

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Countermeasures to Urban Heat Islands (SICCUHI)
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Why I need this proposal.

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Motivation

1. Early studies

“Heat island intensity” T. R. Oke (1973)

2. Issue of coastal area

Kobe, Japan. – Where is rural?

3. My proposal

Estimate urban influence

with sea water temp. – coastal air temp. relation.

Kobe

West Japan

Blue: vegetation

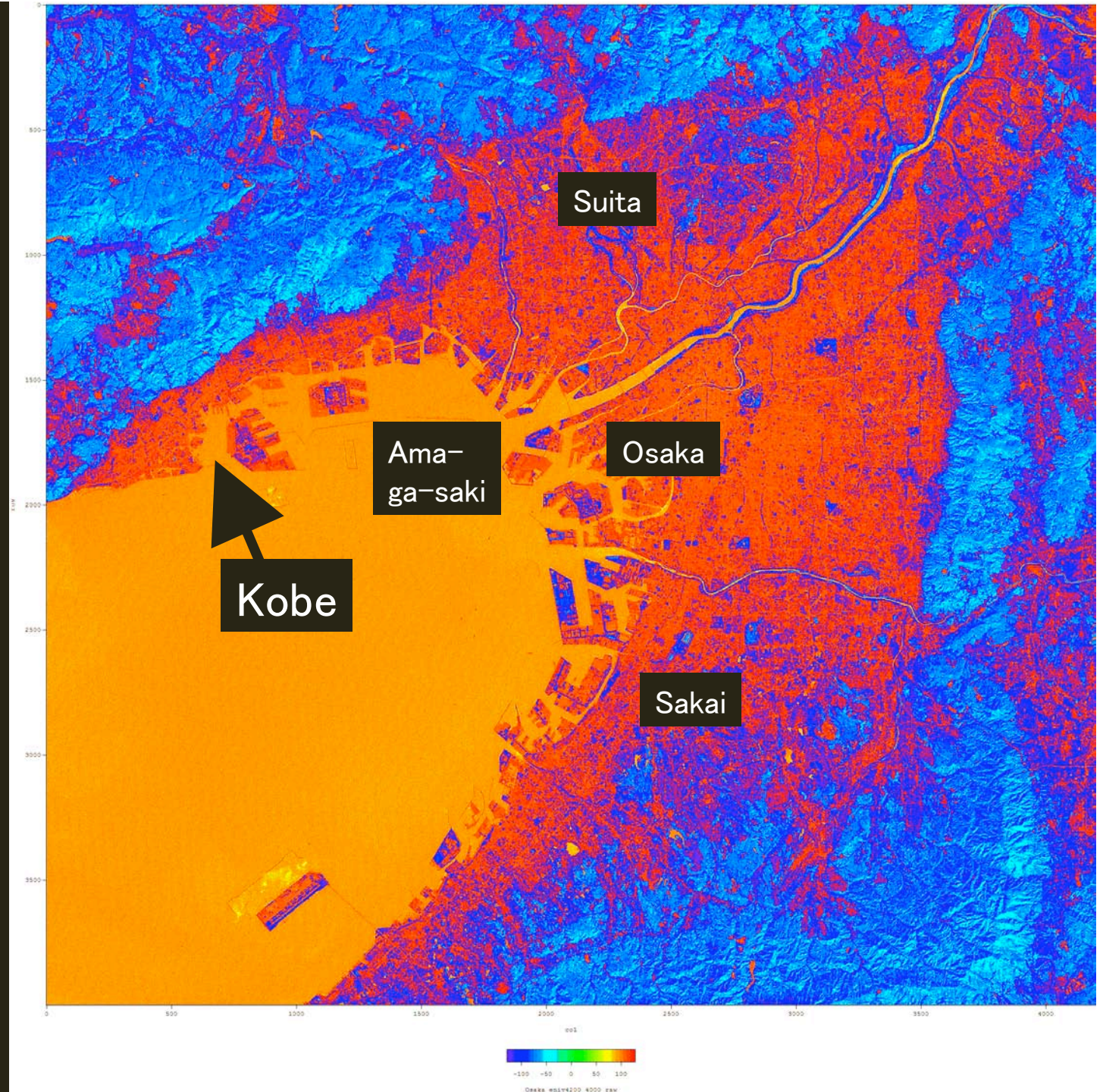
Orange: urban

Yellow: sea

– Similar with Berkeley

– Different from Berkeley

– Where is the rural of Kobe?



Motivation

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with sea water temp. – coastal air temp. relation.

2. Methods

Subject Area



2. Methods

Subject Area

Seto Inland Sea, Japan



2. Methods

Subject Area

Seto Inland Sea, Japan



Borders



2. Methods

Subject Area

Seto Inland Sea, Japan

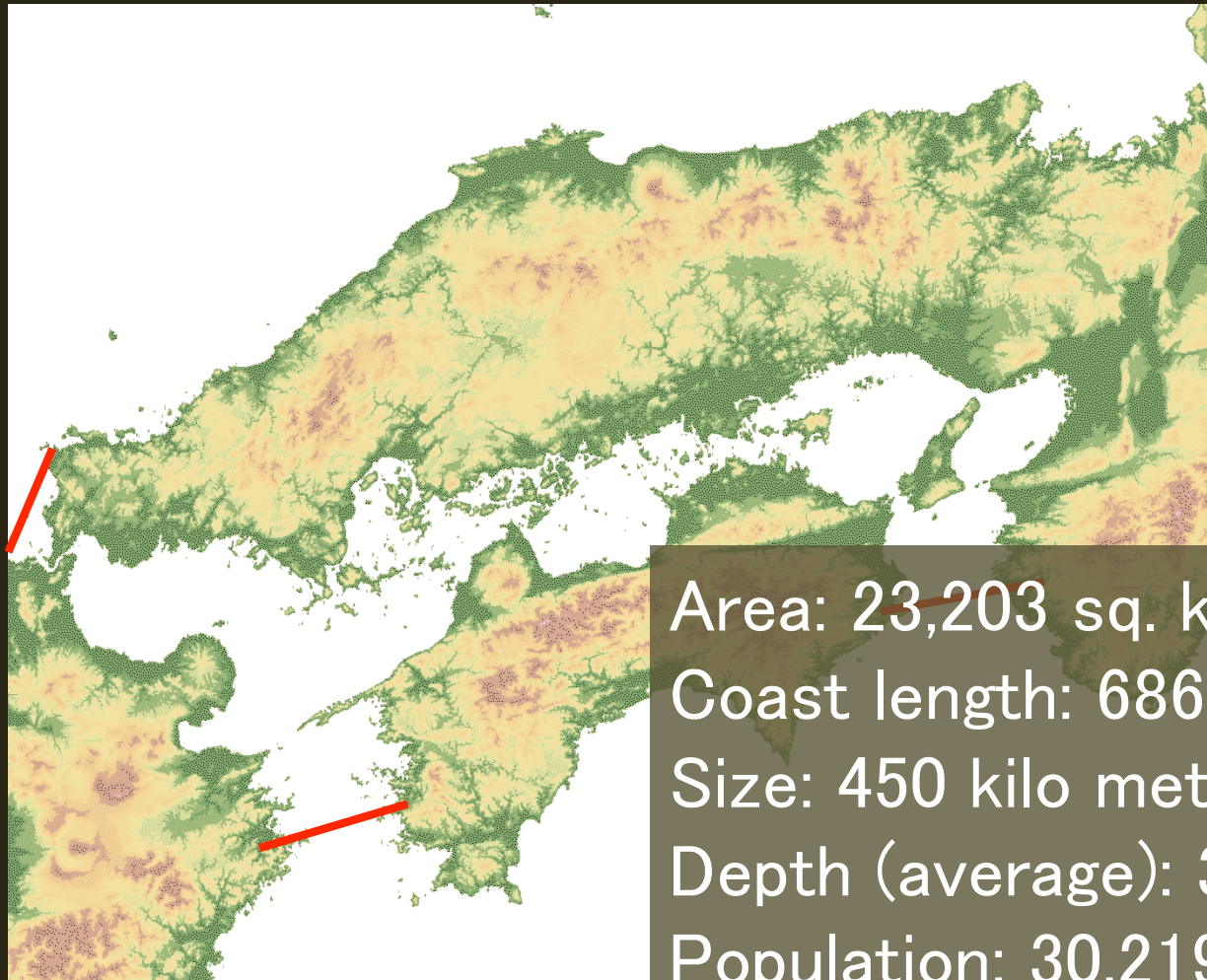
Major cities



2. Methods

Subject Area

Seto Inland Sea, Japan



Properties

Area: 23,203 sq. kilo meters

Coast length: 6868 kilo meters

Size: 450 kilo meters (west-east)

Depth (average): 38 meters

Population: 30,219,000 (1999)

2. Methods

Database

a) Sea water temperature

Observed at 2 meters depth

2000 - 2004 (5 years)

The obs. started 142 points in 1982,
up to 229 in 2006

b) Air temperature

Urban core is OK. But where is rural?

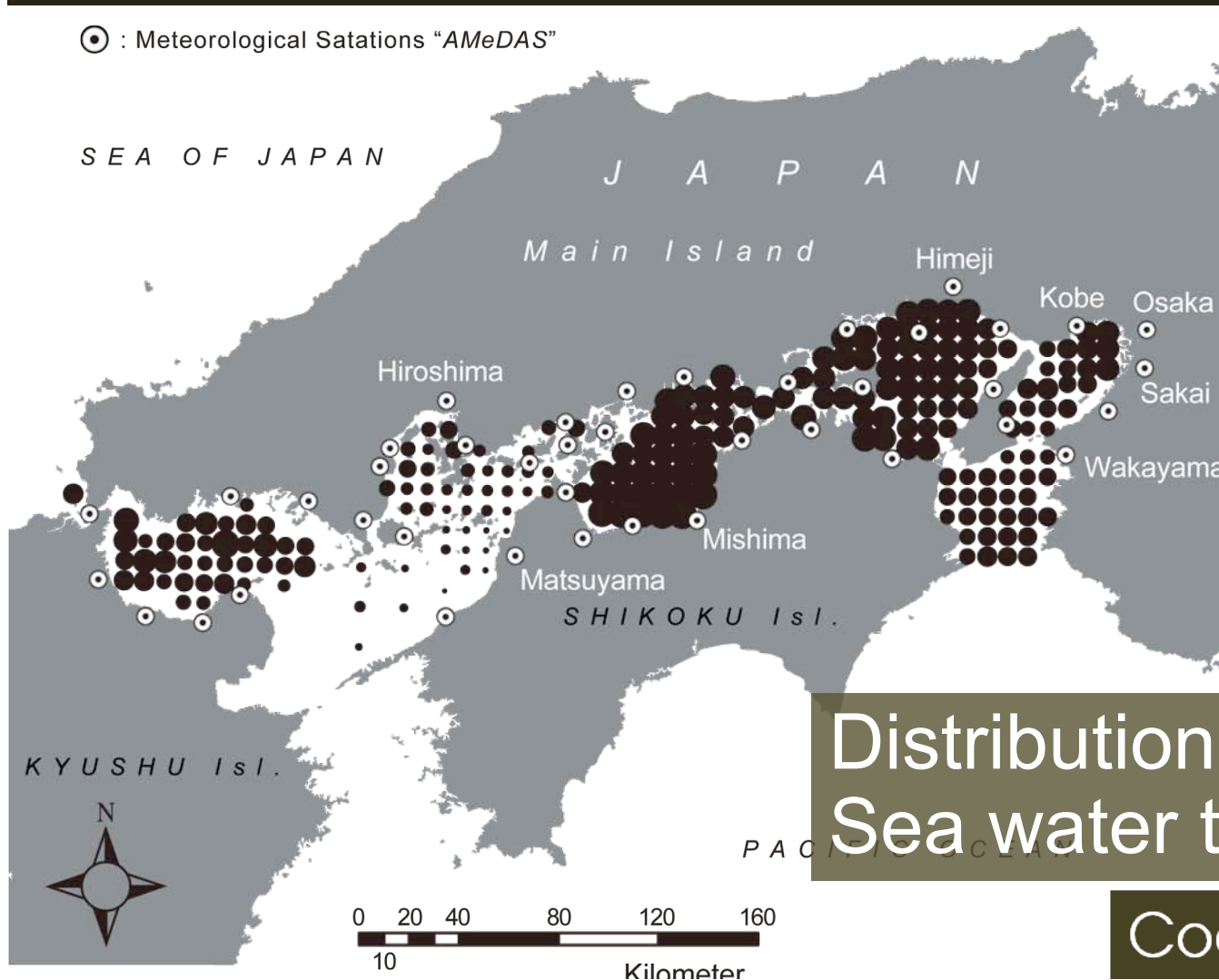
Sea breezes are same?

2. Methods Database

a) Sea water temperature



⊙ : Meteorological Satations "AMeDAS"



Distribution of Sea water temperature

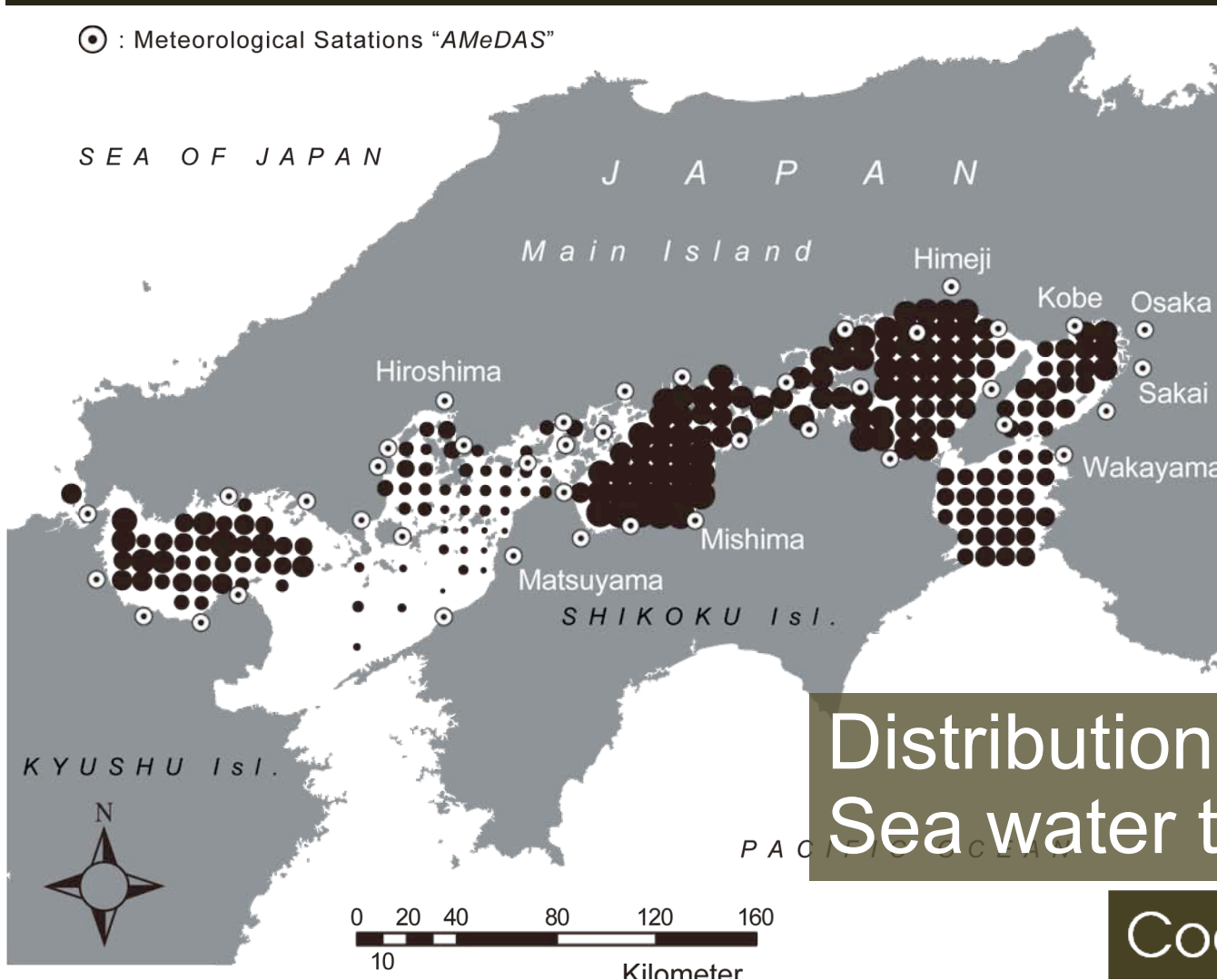
Cool ← ● ● ● → Warm

2. Methods Database

a) Sea water temperature



⊙ : Meteorological Satations "AMeDAS"



Summer
Daytime

Left image
shows
2000–2004
average sea
water temp.

Distribution of
Sea water temperature

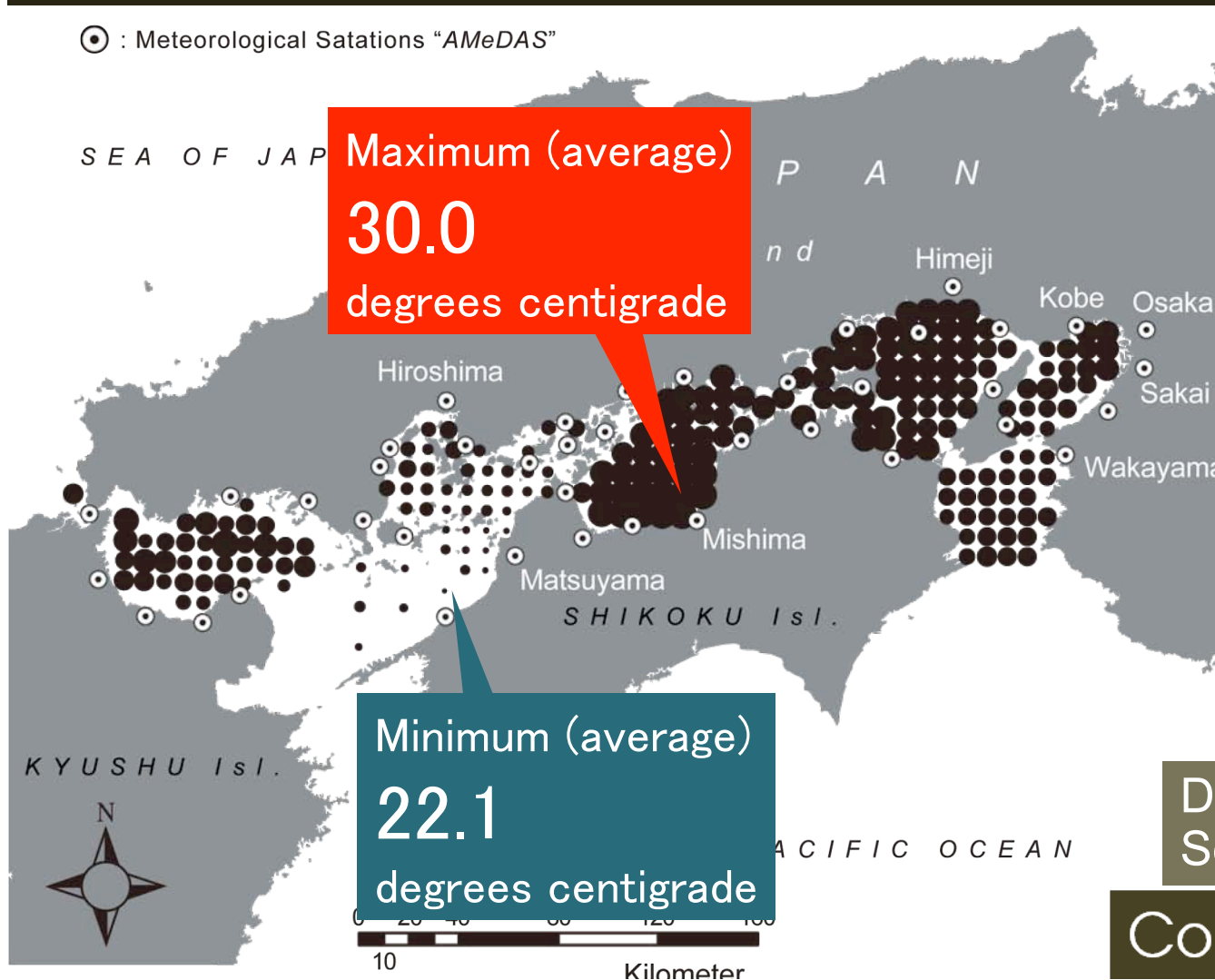
Cool ← ● ● ● → Warm

2. Methods Database



a) Sea water temperature

⊙ : Meteorological Satations "AMeDAS"

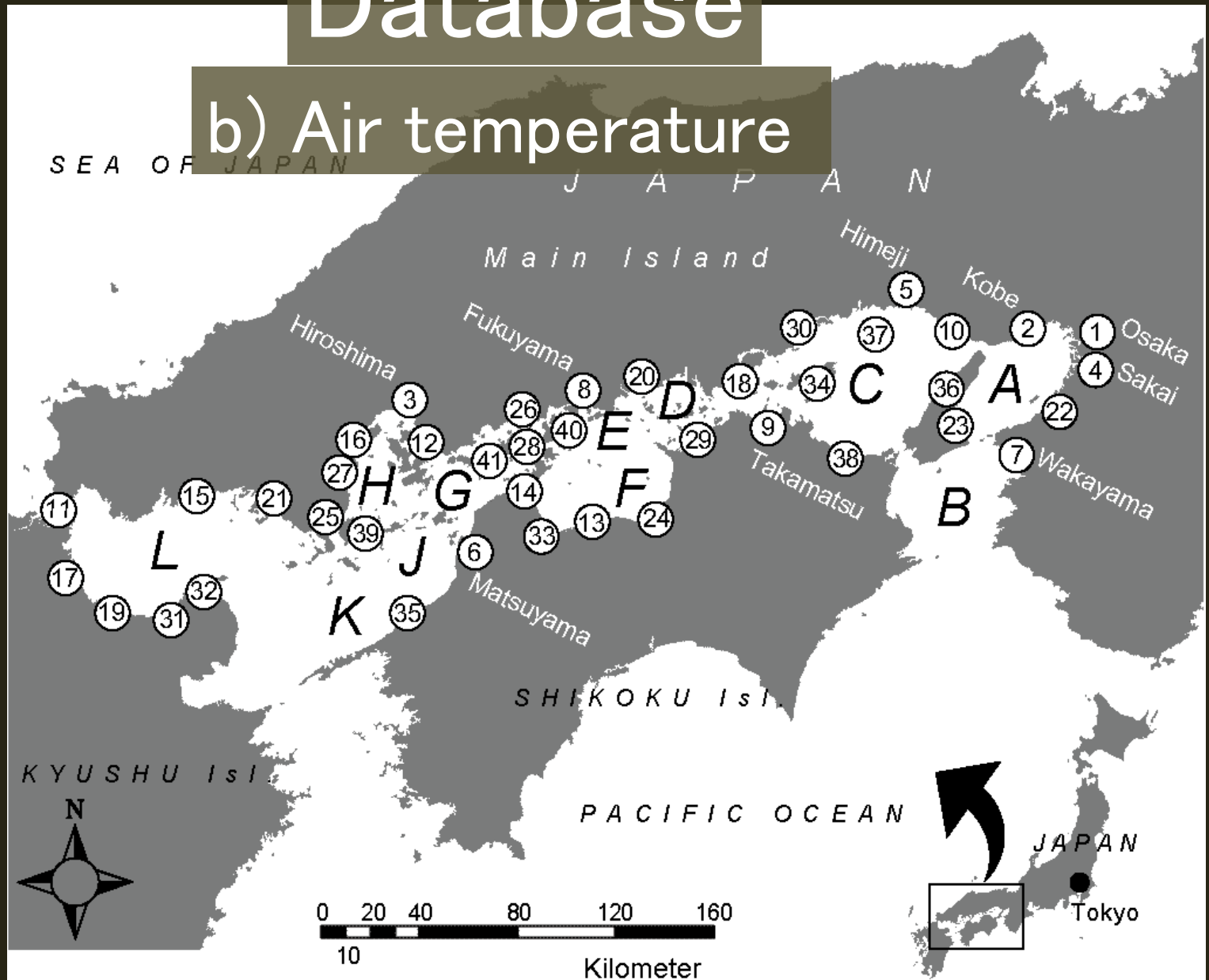


Distribution of
Sea water temperature

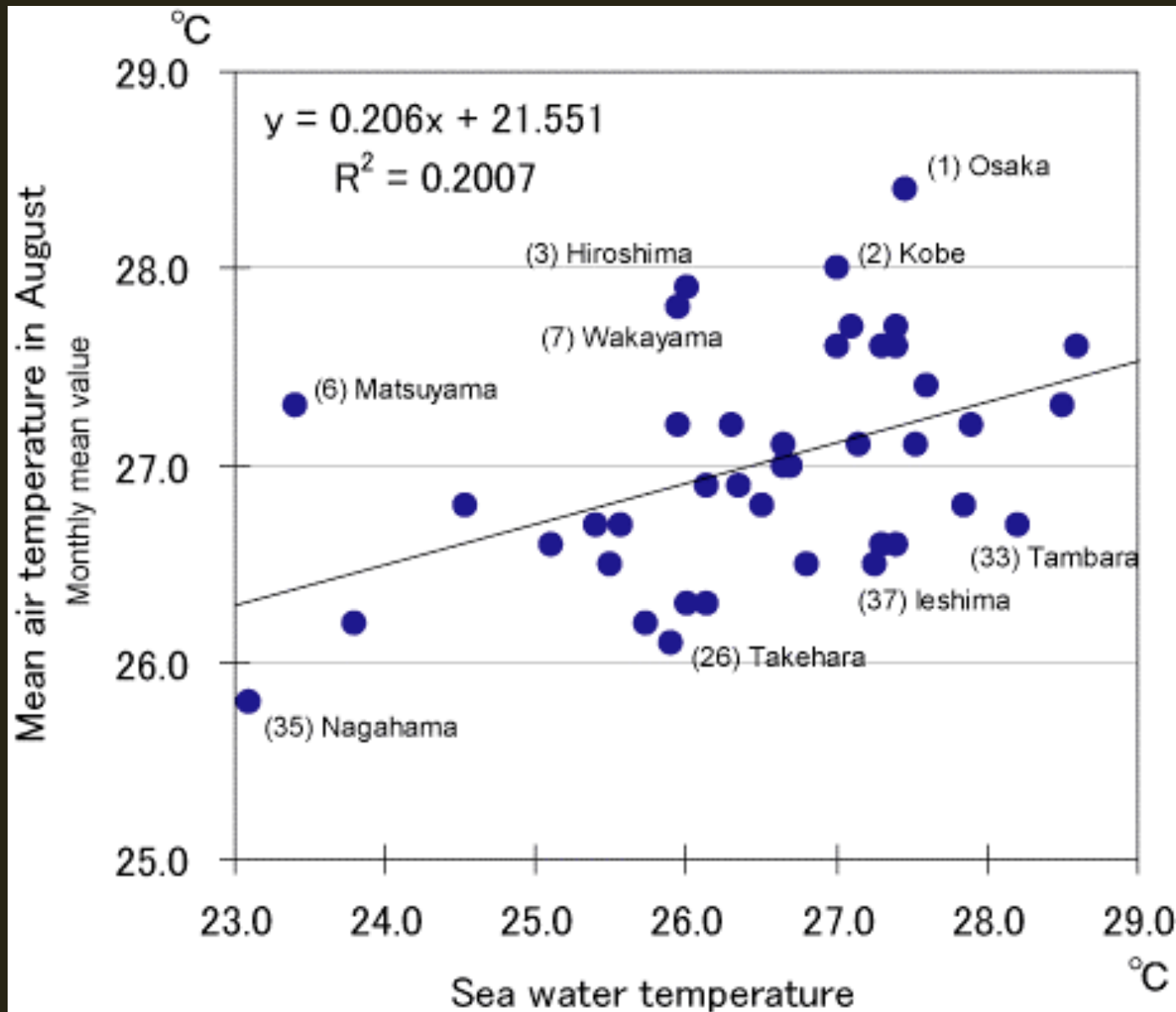
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2. Methods Database

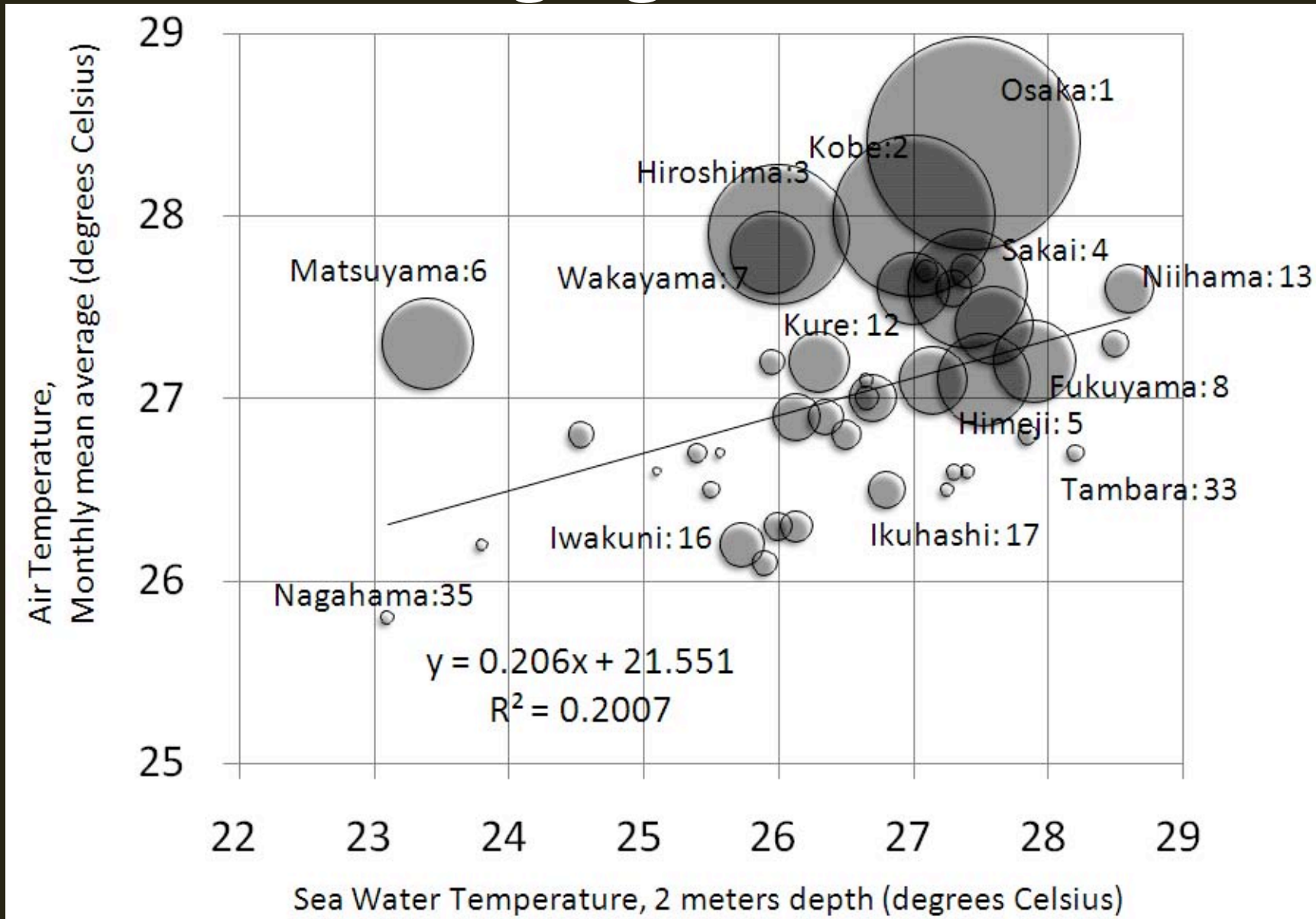
b) Air temperature



3. Highlight data

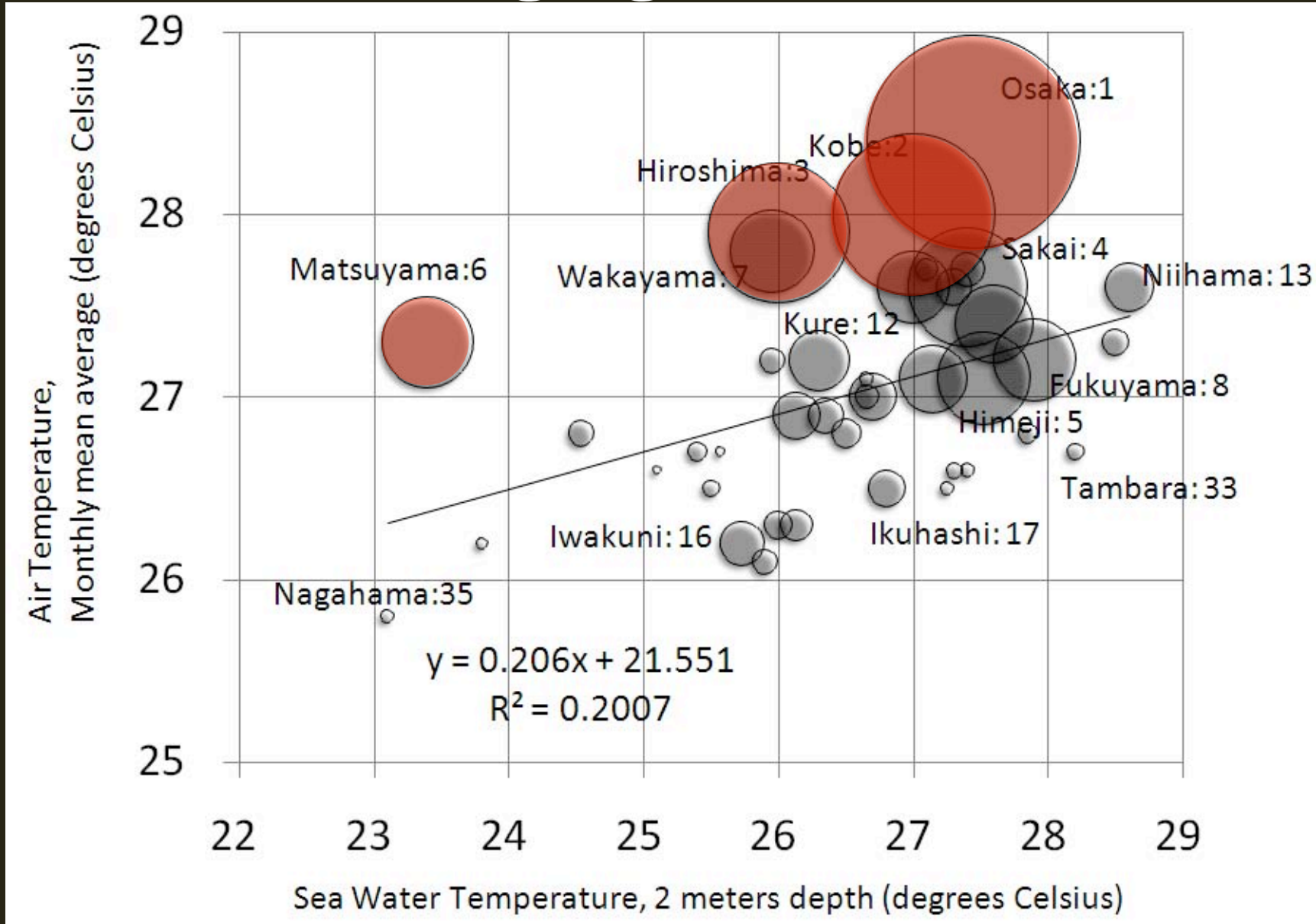


3. Highlight data



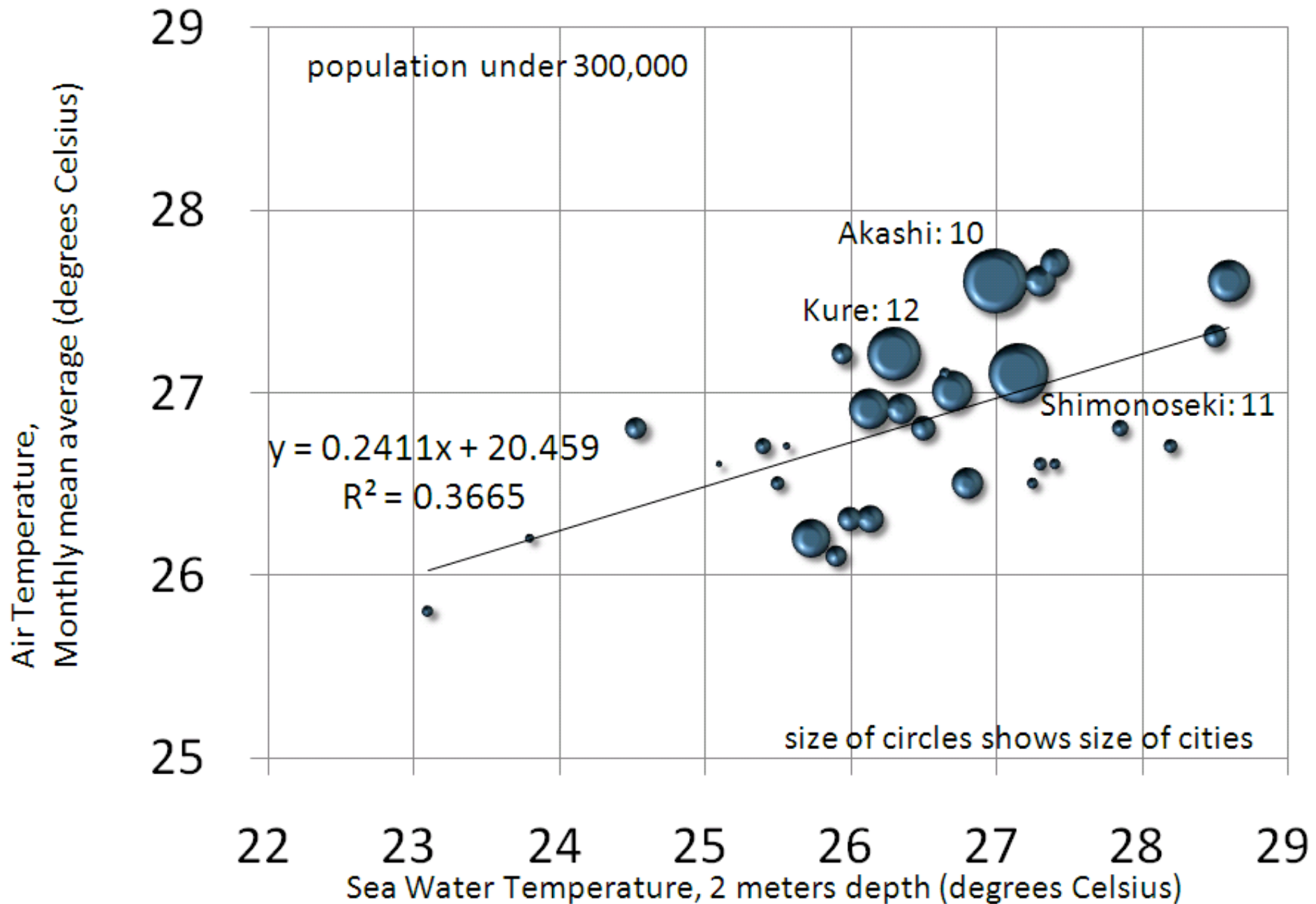
Size of circles shows size of cities (population)

3. Highlight data

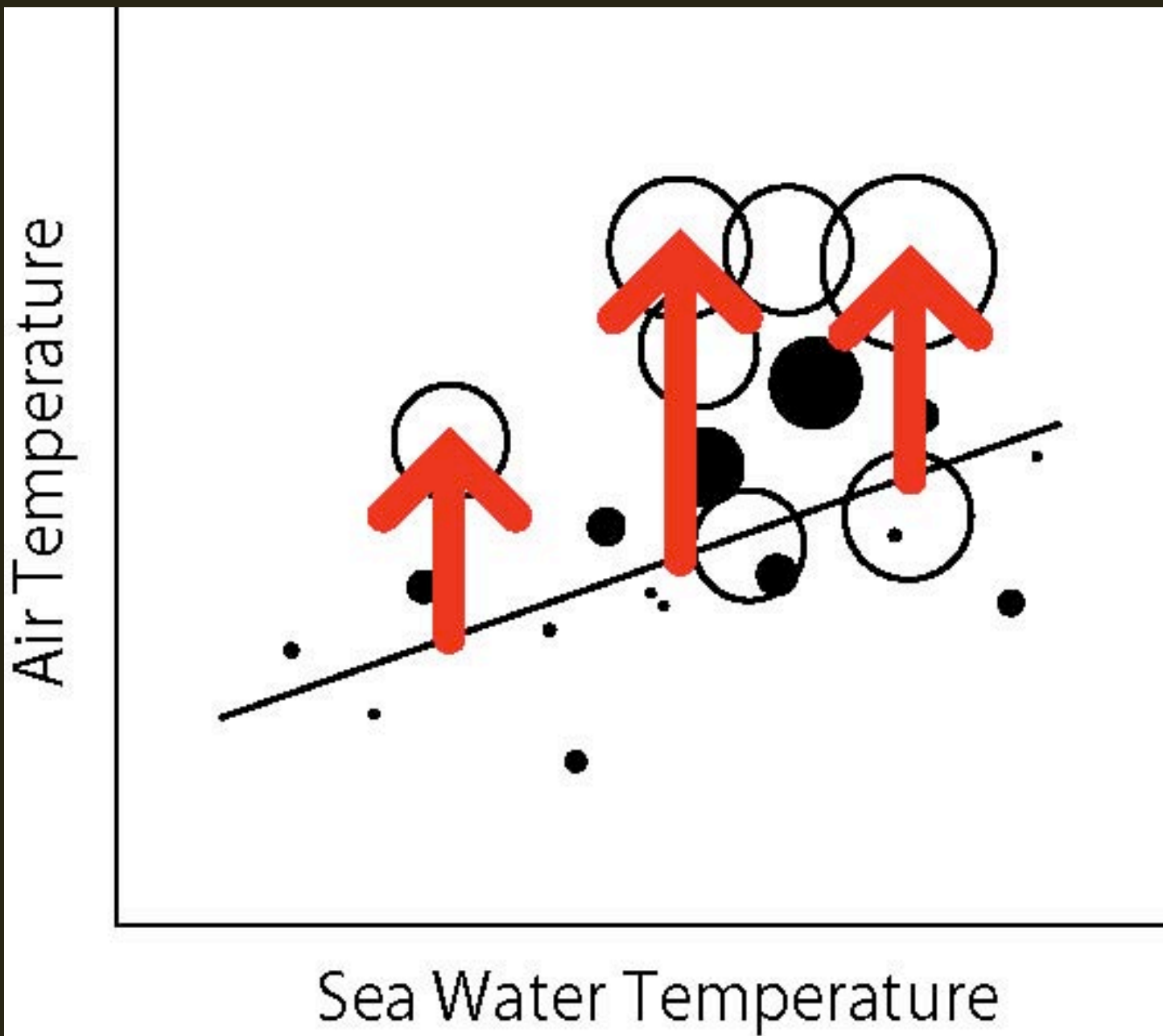


Size of circles shows size of cities (population)

3 Highlight data



3. Highlight data



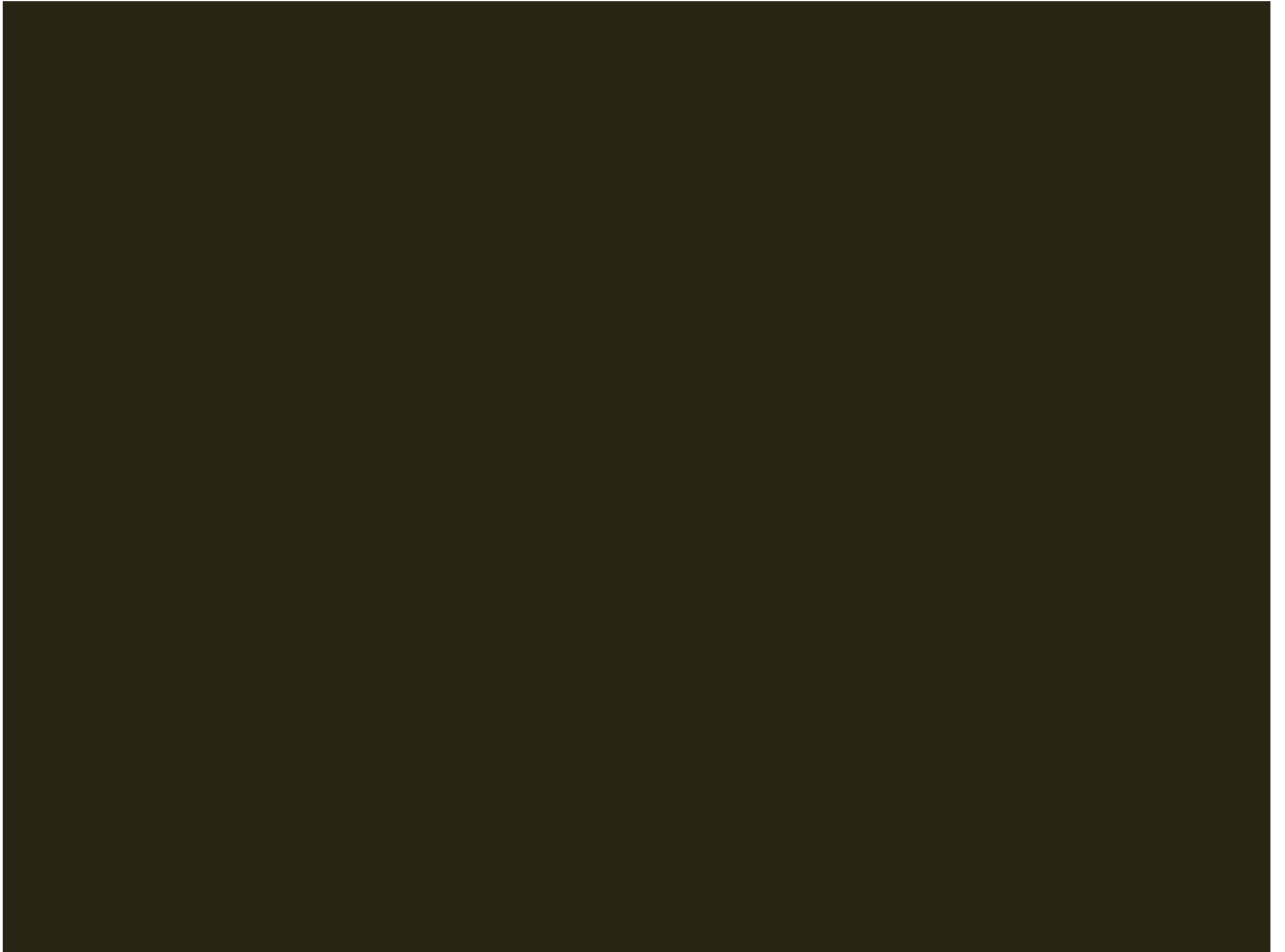
4. Summary

- Sea water temperature varied in range of 22.1 - 30.0 degrees centigrade. (Summer)
- Air temperature positively correlated with Sea water temperature.
- This Sea water temperature push up/down The coastal air temperature.
- UHI intensity values in coastal urban area should take account of sea water temperature.

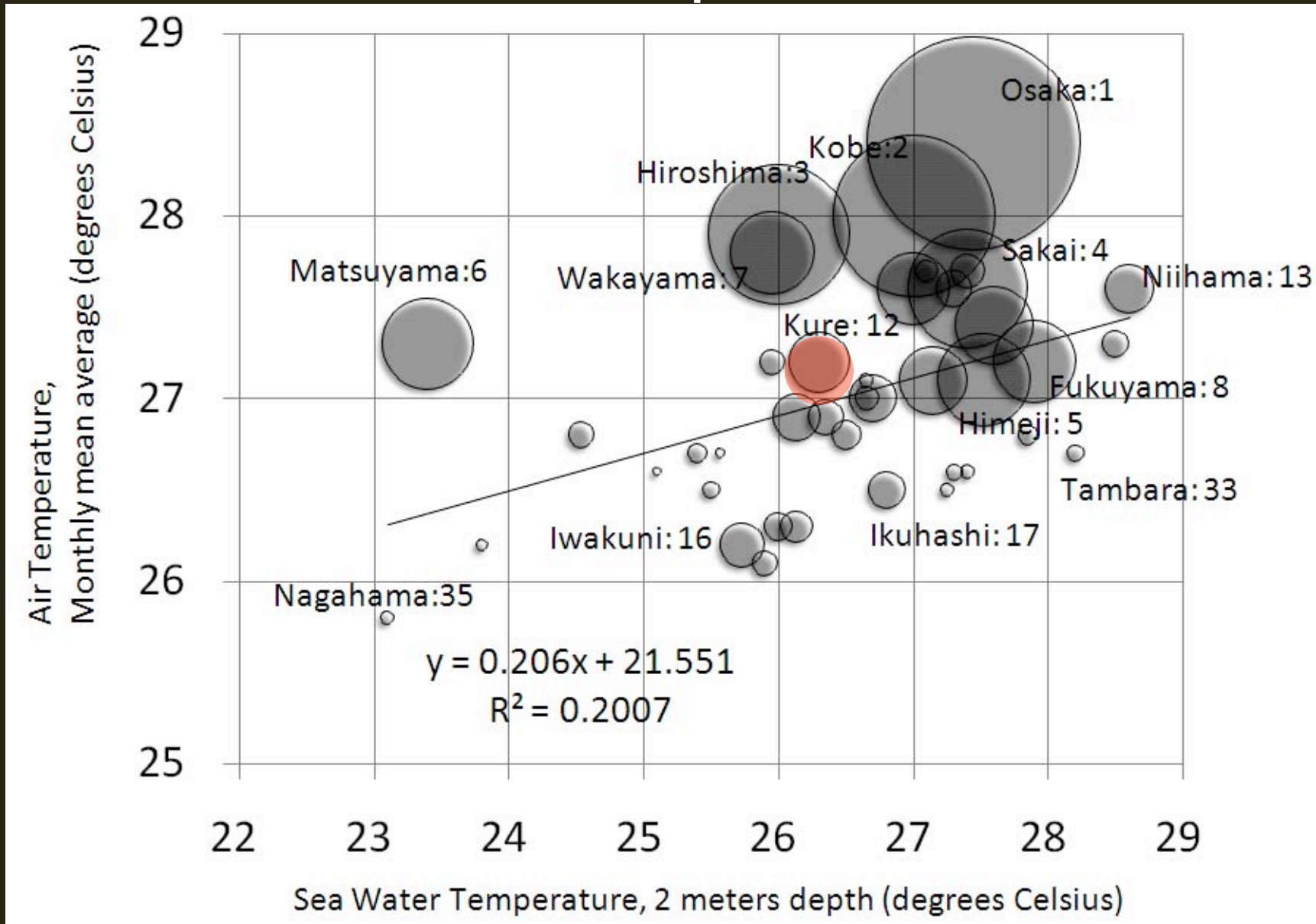
4. Summary

Future plans

- Typical air temperature?
- Numerical simulation
- Possibility of using remotely sensed sea water temperature



4. Future plan



Size of circles shows size of cities (population)

4. Future plan

Image from Google



Location of **Kure** meteorological station