



CLIMATE CHANGE & COASTAL TOURISM

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International Centre for
Integrated assessment and
Sustainable development

CLITOP

International Conference on Climate Change Impacts on Tourism
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DISCUSSION

- “We give you the climate data, you tell us what they mean for our arrival patterns in 20, 50, 100 years.”
- Much too ambitious, for a number of reasons:
- Climate data resolution is not appropriate
- Future is unpredictable – scenarios, if-then
- Current state is poorly understood: preferences, relative role of climate in destination & activity choice
- Local case studies needed
- Global and consistent tourism datasets needed of relevant resolutions
- Different issues (GEC): different data requirements



- Is all our research pointless?
- Climate suitability

THE ISSUE

- Coastal areas and islands are among the most popular tourist destinations
- Coastal areas and in particular small island (developing) states are very sensitive to climate change
- AR4: the 'more significant impacts' of climate change on tourism in coastal areas will result from
 - temperature change
 - extreme events
 - floods
 - erosion, and
 - biological effects; e.g. coral reefs – important resources for some destinations – are under large pressure



- For a discussion on tourism in the IPCC AR4, see: Amelung, B., Moreno, A., & Scott, D. (in press). The Place of Tourism in the IPCC Fourth Assessment Report: A Review. Tourism Review International.

THIS PRESENTATION

- Suitability
- Tourism Climatic Index (TCI): original version
- Seasonality
- TCI: special version for coastal tourism
- A rudimentary vulnerability analysis
- Weather type approach
- Focus on most suitable weather type for coastal (beach) tourism
- Future work (& conclusions)



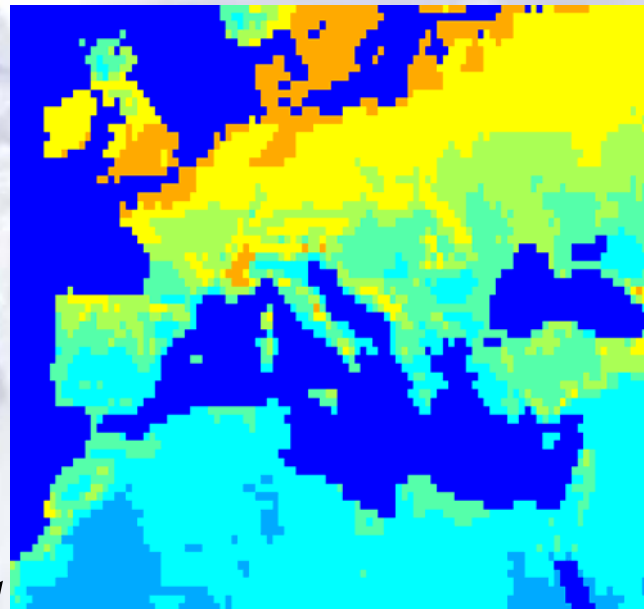
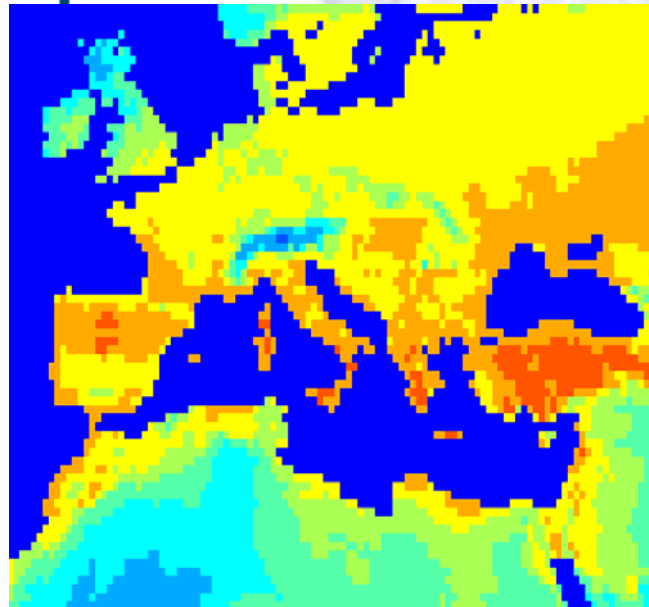
TOURISM CLIMATIC INDEX (TCI)

- Mieczkowski, Z. (1985).
- Assess climatic elements relevant to general tourism activity (in principle adaptable to specific kinds of activities)
- 7 monthly climatic variables grouped in 5 sub-indices:
 - **CID**: Daytime Thermal Comfort Index (°C)
 - **CIA**: Daily Thermal Comfort Index (°C)
 - **P**: Total Monthly Precipitation (mm)
 - **S**: Hours of Sunshine (h/day)
 - **W**: Wind Speed (km/h)
- Every sub-index is **rated** according to variable's value (max rate: 5)
- and **weighted** according to its relative importance
- Optimal value: 100

$$\text{TCI} = 8 \cdot \text{CID} + 2 \cdot \text{CIA} + 4 \cdot \text{P} + 4 \cdot \text{S} + 2 \cdot \text{W}$$

SUMMER: FROM NOW TO 2080

Rapid
climate change



Ideal

Excellent

Very good

Good

Acceptable

Marginal

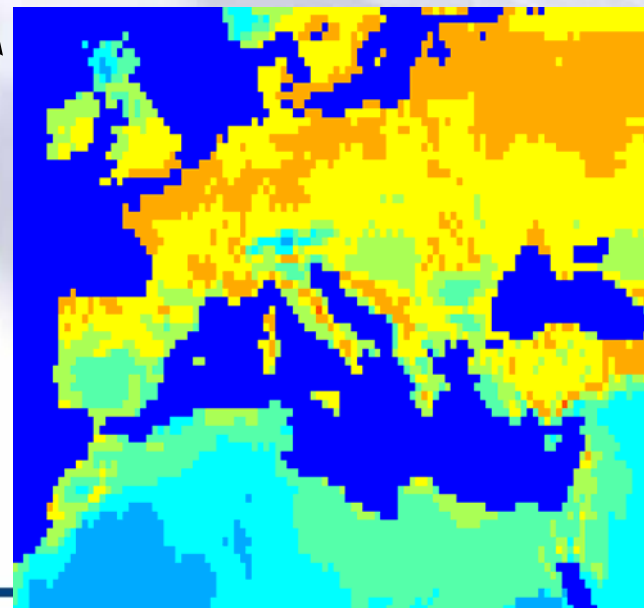
Unsuitable

Bad

Slower
climate change

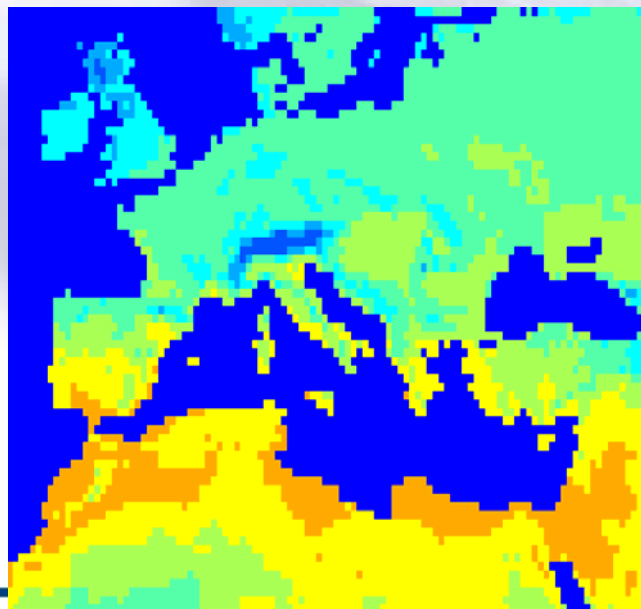
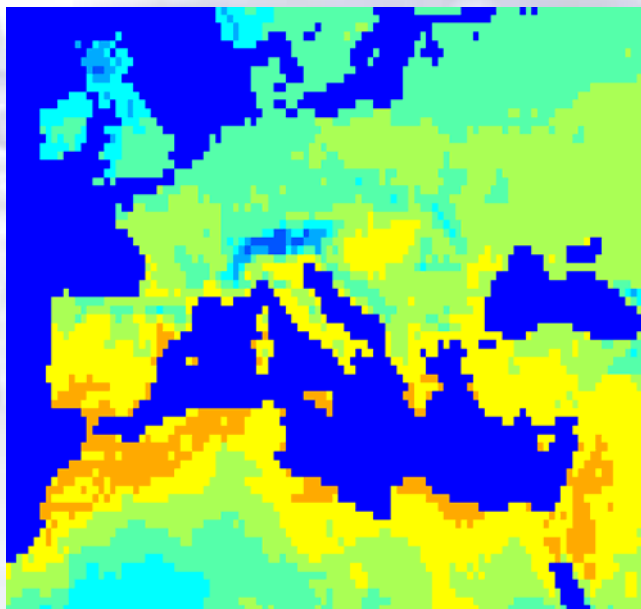
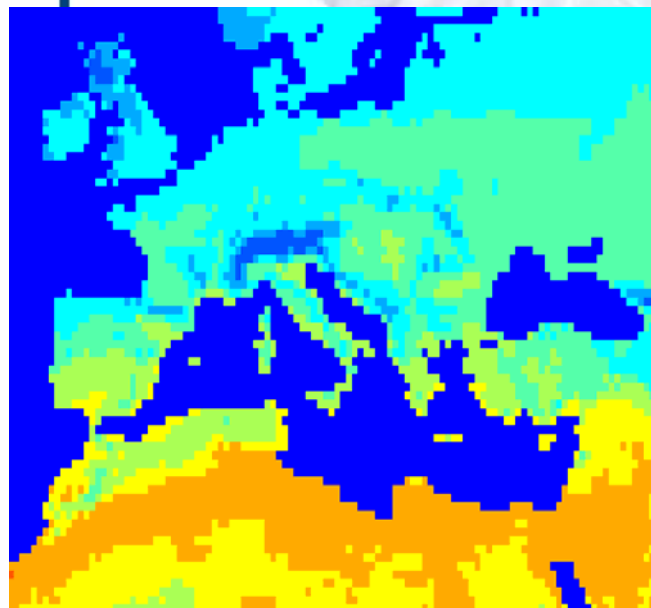


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SPRING: FROM NOW TO 2080

Rapid
climate change



Ideal

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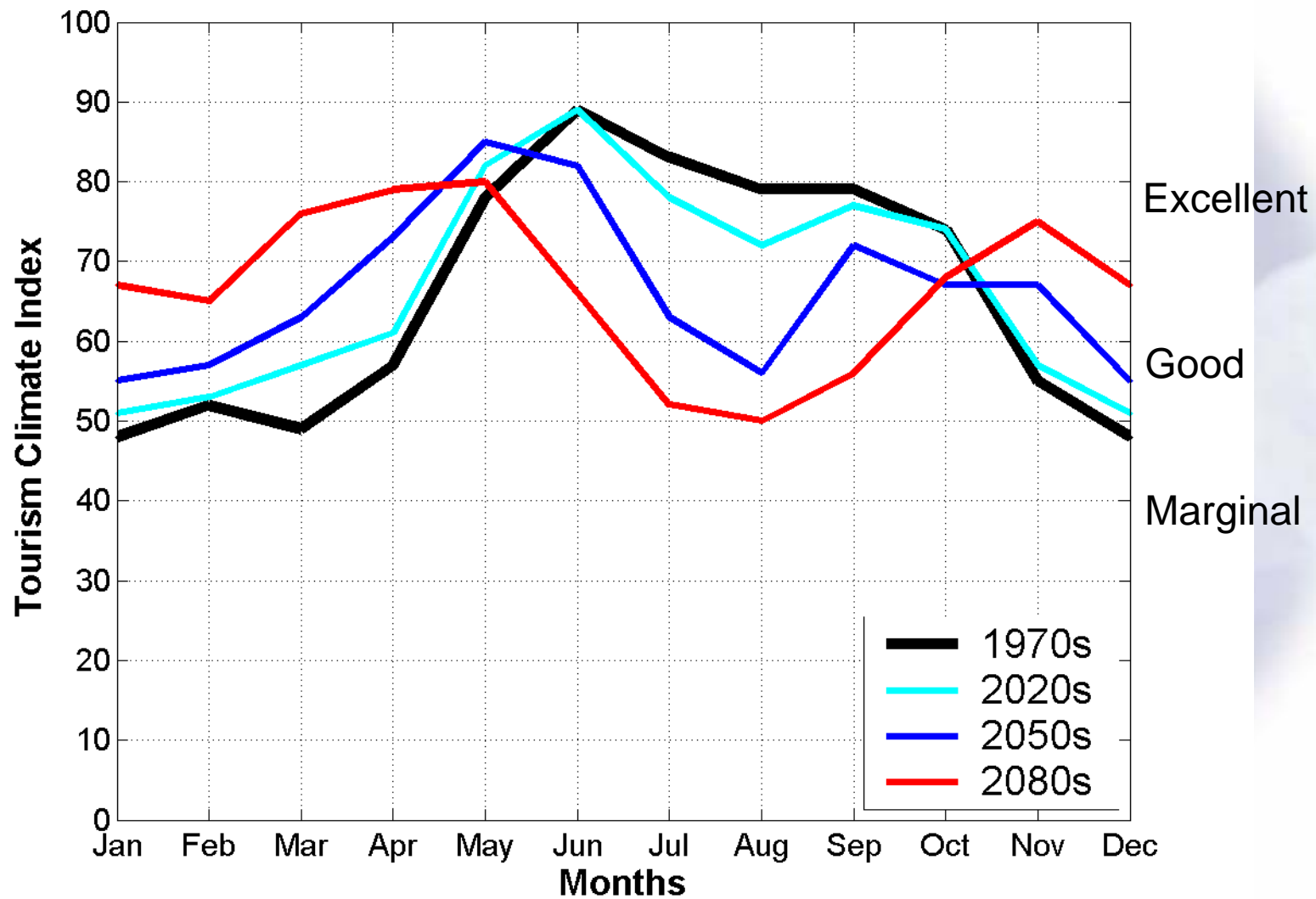
Marginal

Unsuitable

Bad

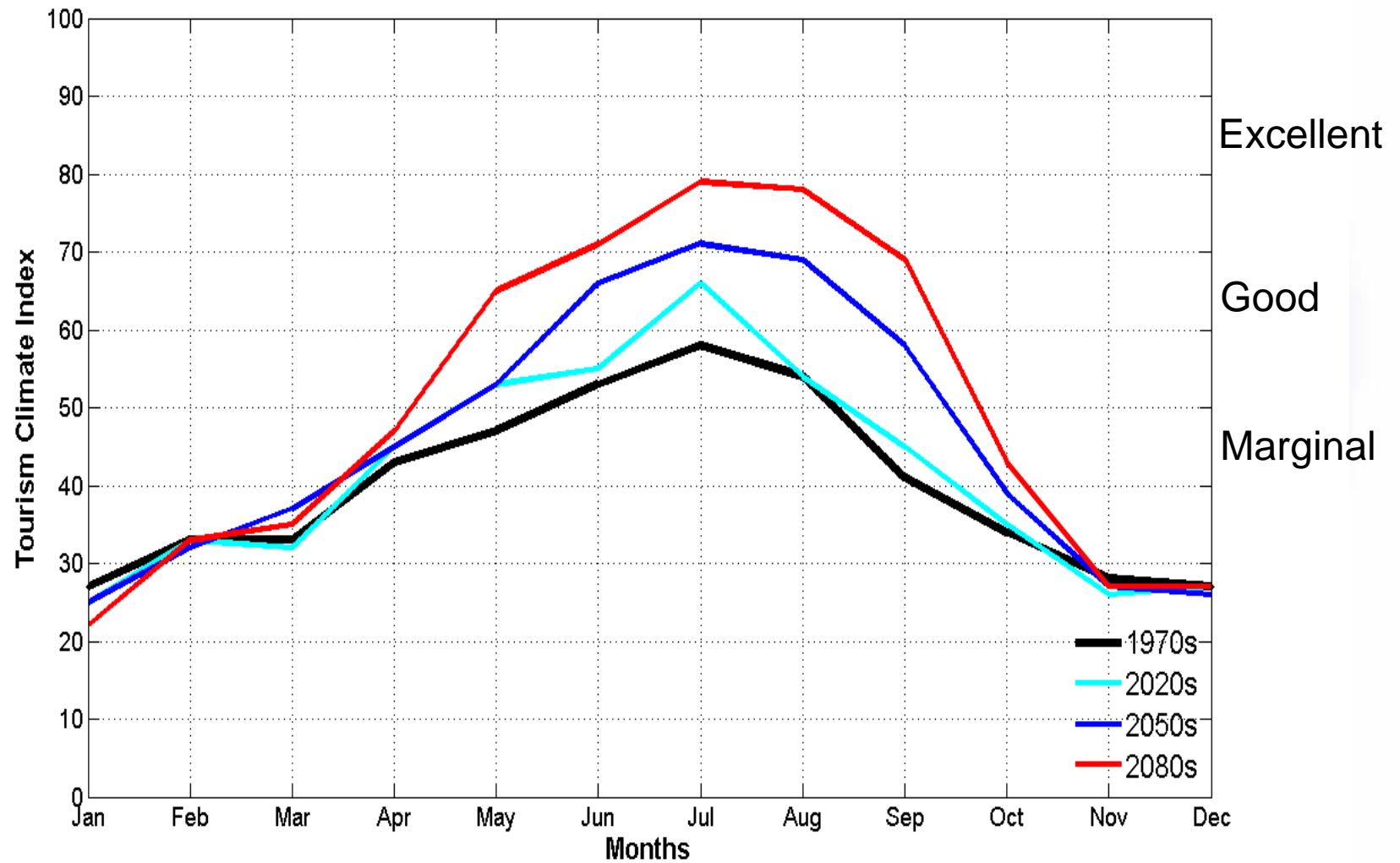
Slower
climate change

PALMA DE MALLORCA

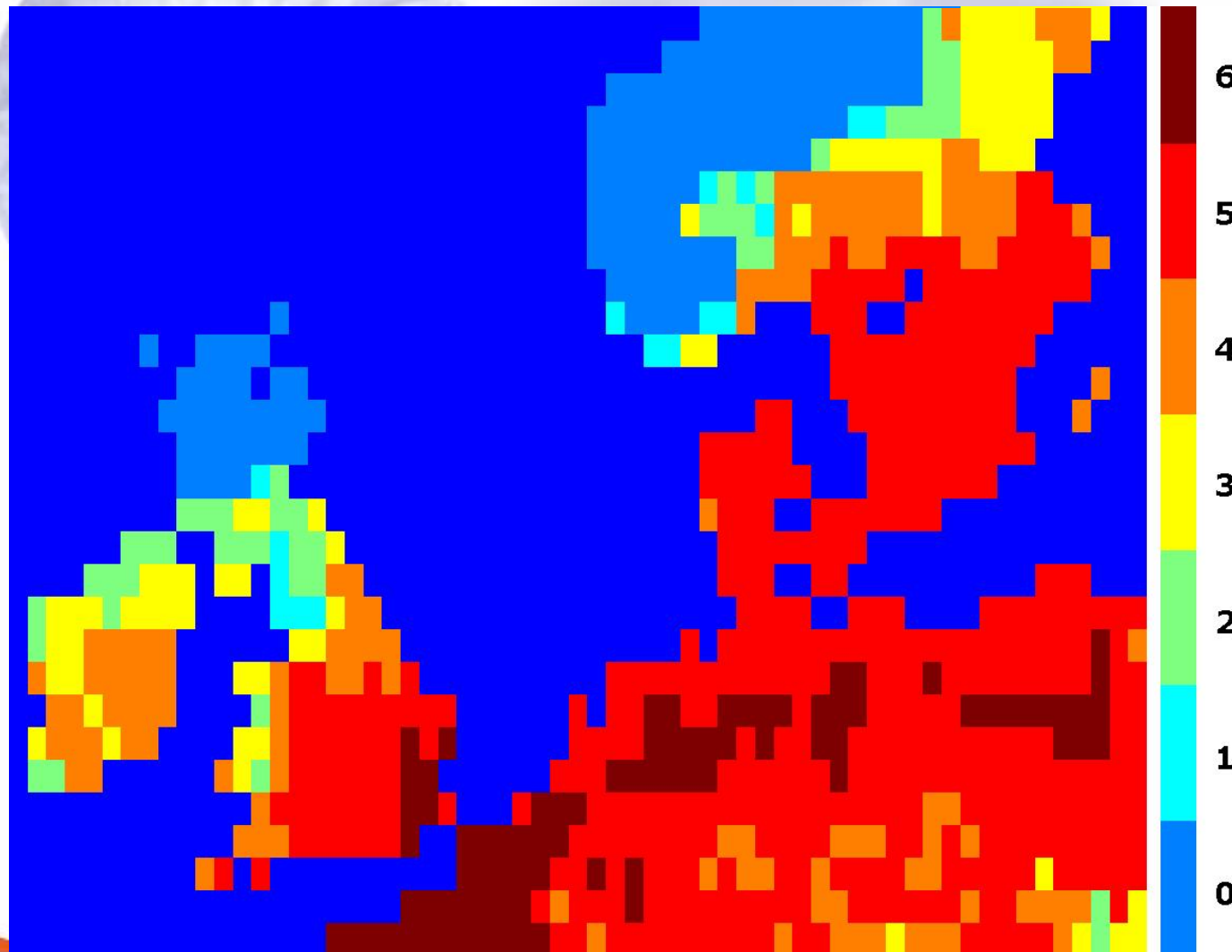


Source: Amelung, B., & Viner, D. (2006). Mediterranean tourism: Exploring the future with the Tourism Climatic Index. *Journal of Sustainable Tourism*, 14(4), 349-366.

BLACKPOOL: LONGER SEASON



'GOOD' MONTHS IN 2030A1F



Source: Amelung, B., Nicholls, S., & Viner, D. (2007). Implications of Global Climate Change for Tourism Flows and Seasonality. *Journal of Travel Research*, 45(3), 285-296.



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VULNERABILITY extent to which a natural or social system is susceptible to sustaining damage from climate change

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graph TD; V[VULNERABILITY] --> S[SENSITIVITY]; V --> E[EXPOSURE]; V --> AC[ADAPTIVE CAPACITY]; S --> R[Vulnerability of a sector...]; E --> R; AC --> R;
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SENSITIVITY

The degree to which a human-environment system is affected, either adversely or beneficially, by environmental change

EXPOSURE

The nature and degree to which ecosystems are exposed to environmental change

ADAPTIVE CAPACITY

The potential to implement planned adaptation measures

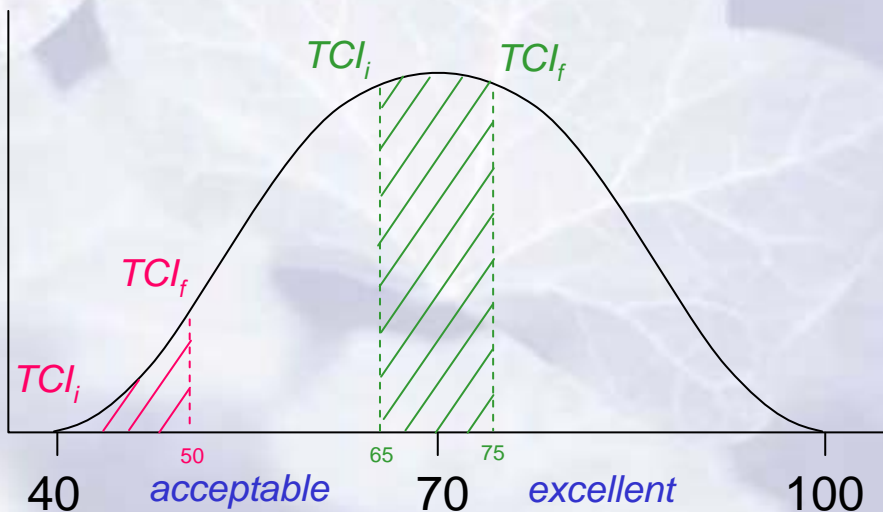
Vulnerability of a sector relying on a particular **ecosystem service** at a particular **location** under a certain **scenario** and at a certain point in **time**



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OPERATIONALISING VULNERABILITY

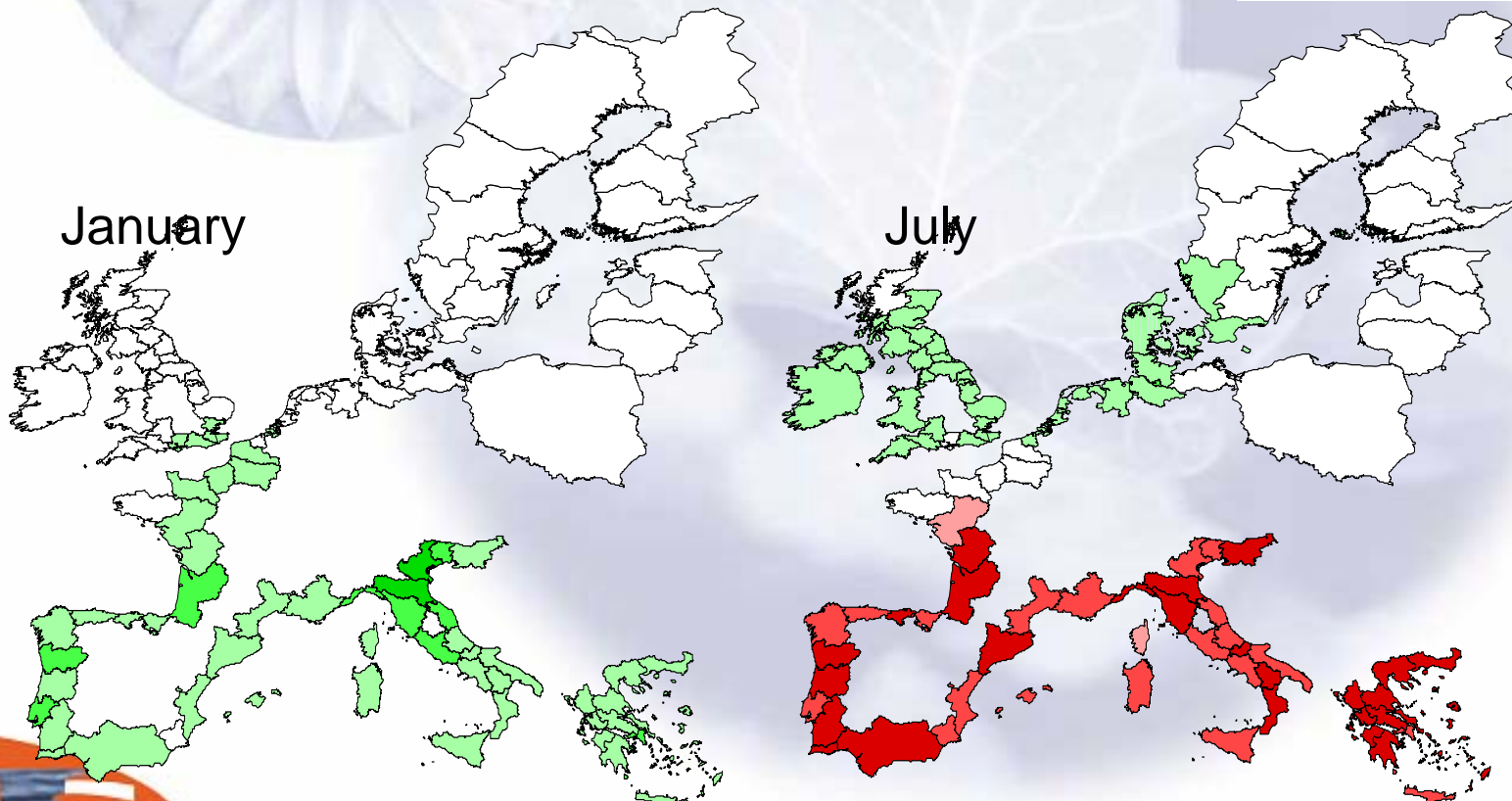
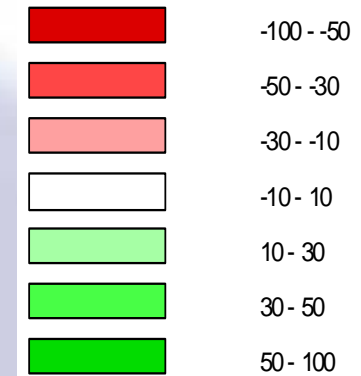
- Sensitivity: proximity to “breakpoint”
- Exposure: “degree” of change of the TCI



- Adaptive Capacity
 - Population density
 - GDP per capita

POSITIVE AND NEGATIVE VULNERABILITY

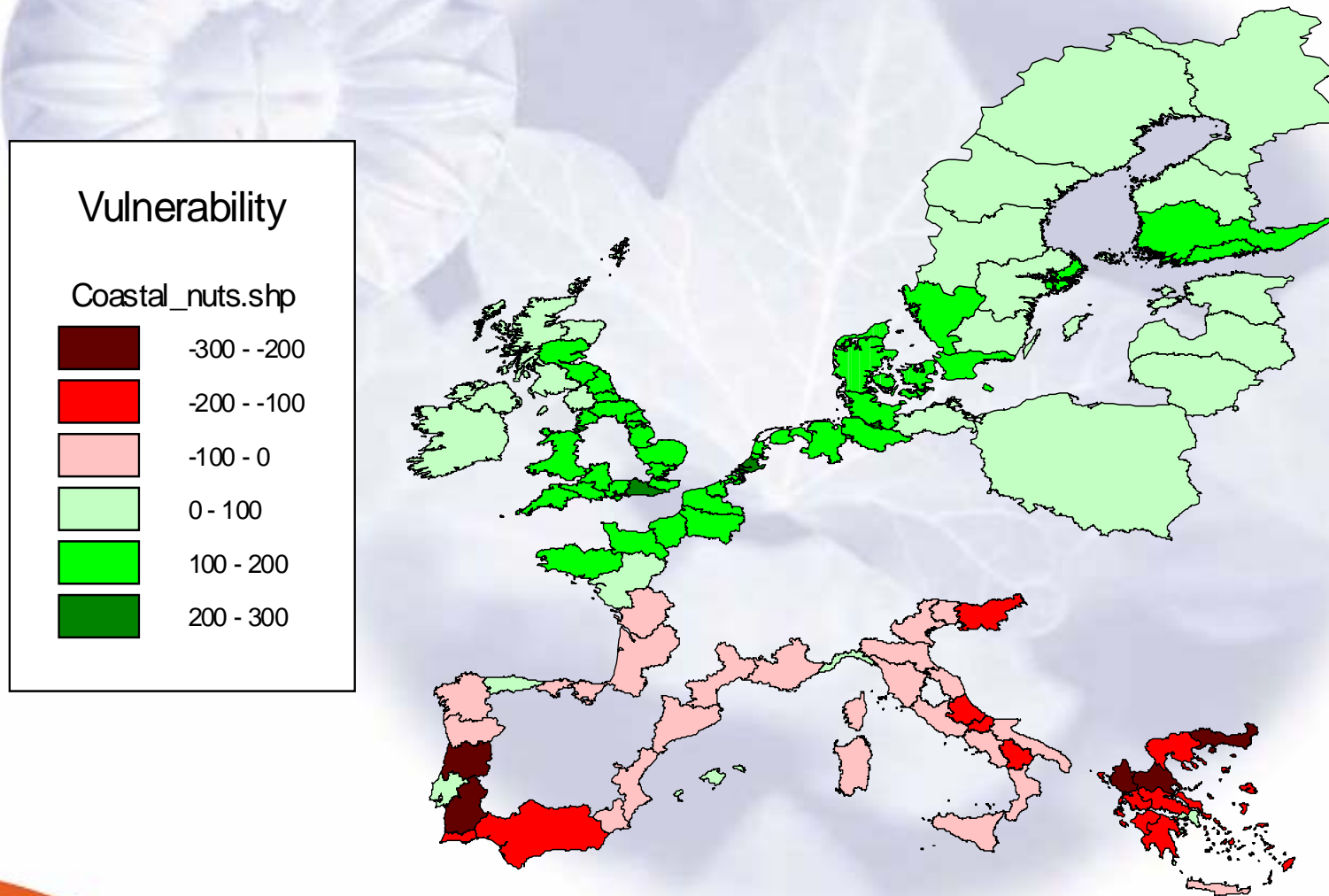
Green: 'positive vulnerability', i.e. high potential
Red: 'negative vulnerability', i.e. 'real' vulnerability



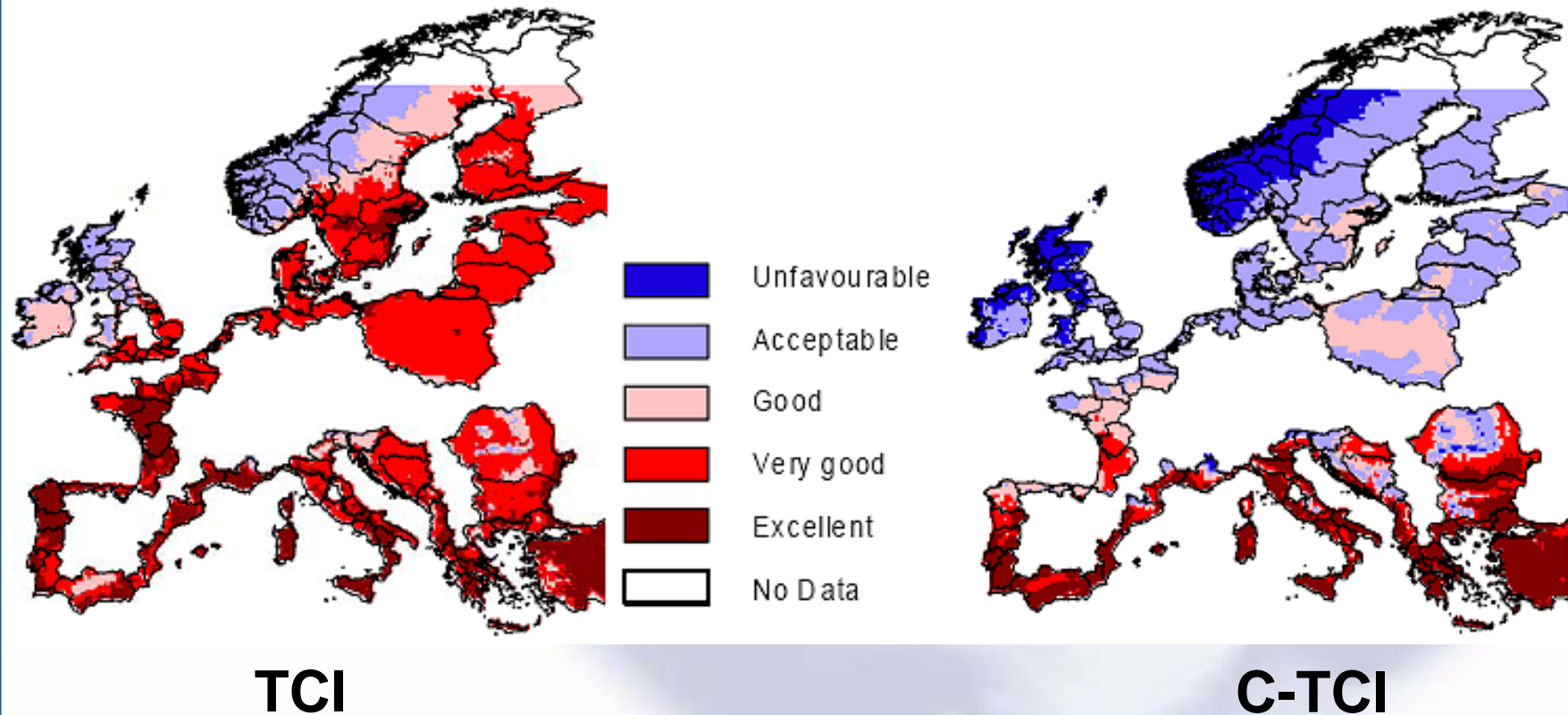
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Source: Amelung, B., & Moreno, A. (2006). Preliminary physical assessment for lot 5: tourism. Deliverable B5 for the PESETA project, commissioned by the European Commission. Maastricht: International Centre for Integrated assessment and Sustainable development.

NET VULNERABILITY



TCI & COASTAL TCI, SUMMER, 1970s



WEATHER TYPES (1)

- Besancenot (1989): Climat et Tourisme. Paris: Masson.
- Assess different configurations of climatic elements that are relevant to different tourism activities
- Elements: e.g. sunshine, maximum temperature, rain, and wind
- No optimum values, just conditions
- Gómez Martín, M. B. (2006). Climate potential and tourist demand in Catalonia (Spain) during the summer season. Climate Research, 32(1), 75-87.
- Considered here: summer-type activities (no winter sports)
- Among these: weather type 1: 'very nice and sunny', suitable for beach tourism



WEATHER TYPES (2)

Nr	Description	Typical activities
1	Very nice and sunny	Sunbathing
2	Nice and sunny	Light activities
3	Cool and sunny	Hiking and similar activities
4	Nice weather, partly clouded	Light activities
5	Nice weather, with an occasional shower	City visits
6	Hot and sultry	Water-side activities
7	Nice weather, with strong winds	Hiking and similar activities
8	Rainy	Unfavourable (indoor activities)
9	Unfavourable (residual category)	Unfavourable (indoor activities)

E.g. Type 1

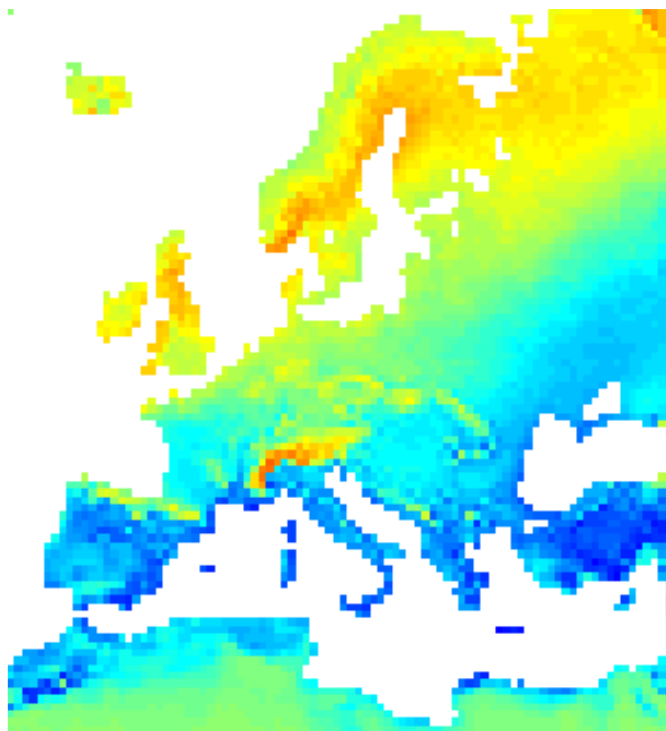
Sun	>9 hours
Rain	0 mm
Tmax	25-31°C
Wind chill	>58 W/m ²
Wind speed	< 8 m/s
Vapour pressure	4-25 hPa



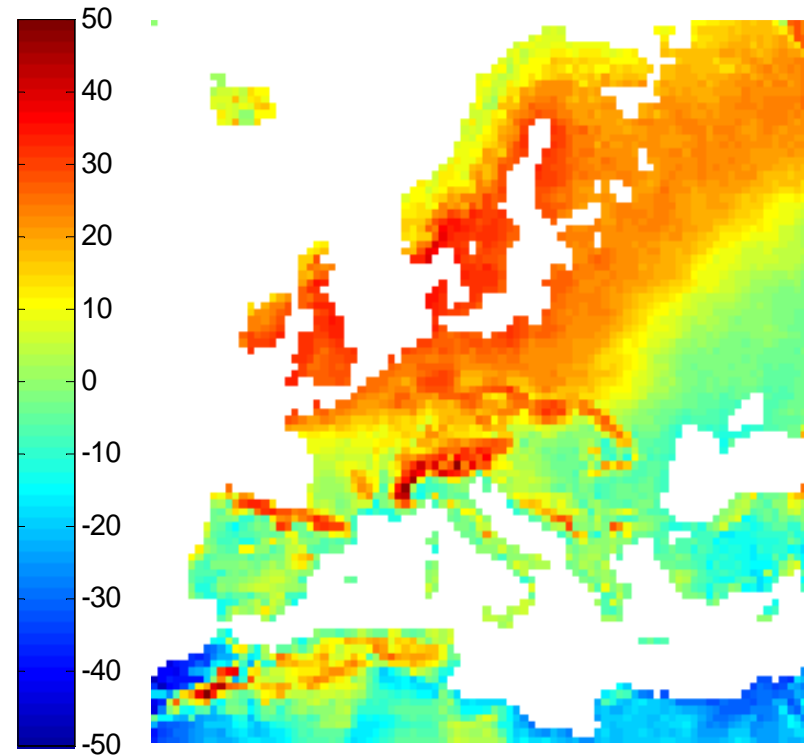
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Source: Adapted from Besancenot, J.-P. (1989). Climat et Tourisme. Paris: Masson.

WEATHER TYPES 1-7: frequency changes 1970s-2080s

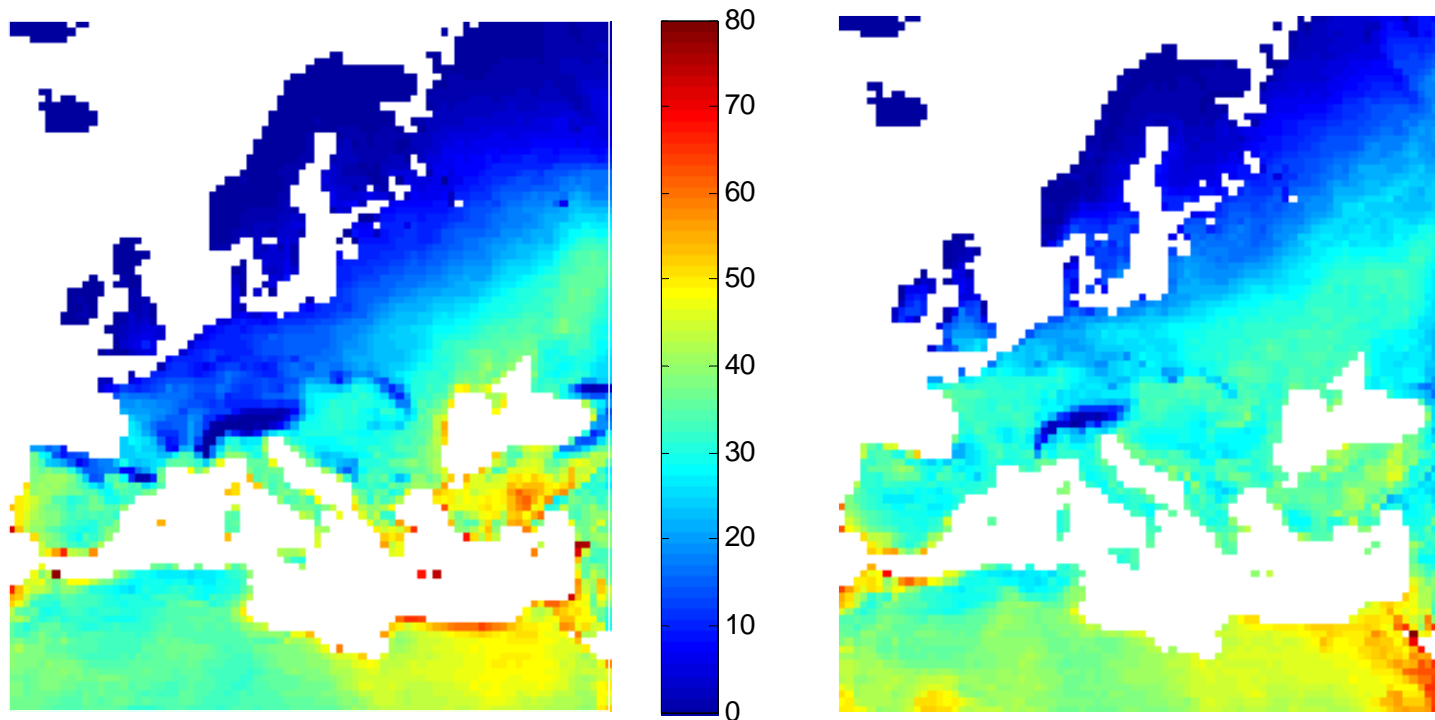


Summer, good days gained/lost



Whole year, good days gained/lost

WEATHER TYPE 1: frequencies in summer



Nr of type 1 days
in an average summer in 1970s

Nr of type 1 days
in an average summer in 2080s

FURTHER RESEARCH (NEEDS)

- Considering different tourism segments/areas
- Using analogues
- Improving our understanding of tourists' response to climate (change)
- Tourism scenarios (societal side)
- Further exploration of links between suitability and demand
- Data of appropriate resolution
- Links to other developments: water, ecosystems, sea level, health, forest fires





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