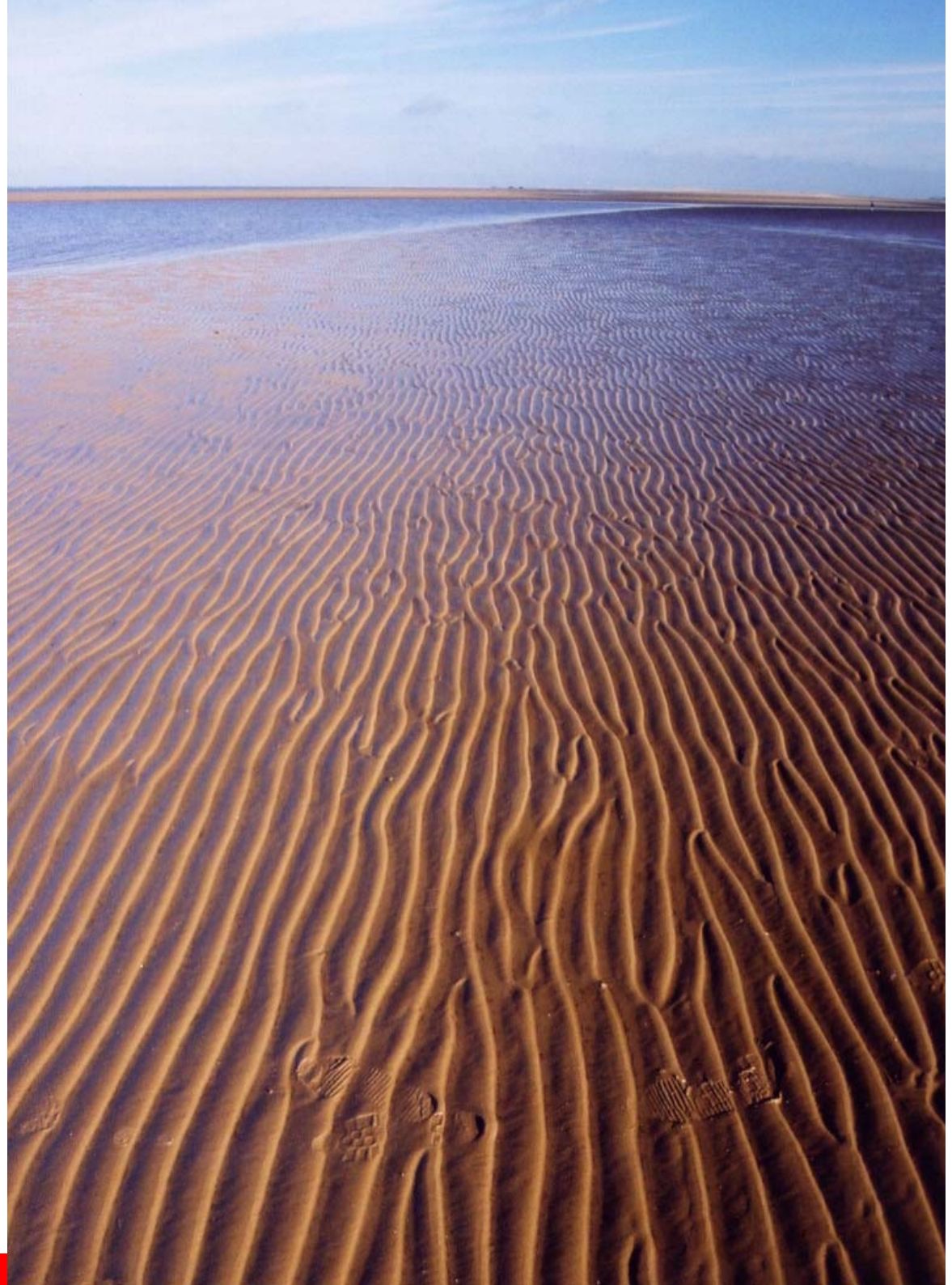


Climate Change Tourism and the Environment:

Dr David Viner

Climatic Research Unit
UEA
Norwich



Presentation Structure

- 1 - Setting the Scene
- 2 - The role of climate Change
- 3 - Scenarios for the Future
- 4 - Tourism Comfort Index
- 5 - Current studies and case studies
- 6 - Discussion



Climate Change and Tourism Research: Past, Present and Future.

Dr David Viner

Principal Specialist Climate Change
Natural England

david.viner@naturalengland.org.uk

www.naturalengland.org.uk



Presentation Structure

A review from a stakeholder.

How things started.

What has been done?

The Future.



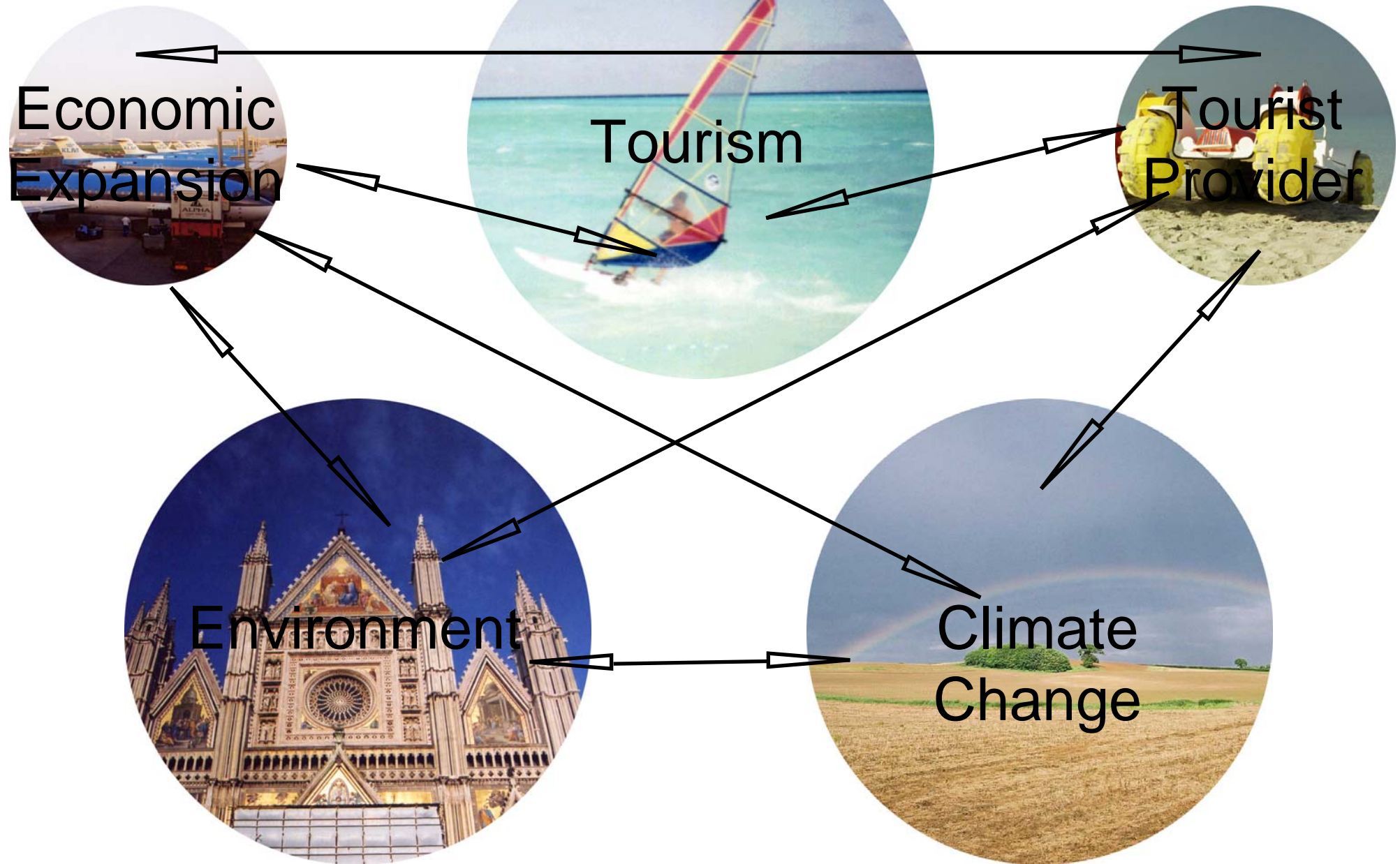
Presentation Structure

How things started.

WTO Conference Djerba 2003



ESF Workshop Milan 2003



Examples of the Interactions: Integration

The Interactions between Climate Change and Tourism: Examples of the Research Questions: Milan 2003

What is the impact of Climate Change on Tourism locations?

What is the contribution of the global tourism industry and its components to climate change?

What would be the impact of, say, an EU aviation fuel tax on internal EU and international tourism flows? On internal EU travel, on the flow of resources from Annex 1 to non-Annex 1 Countries?

Can tourism stakeholders (e.g., travel operators, airlines, airports individual businesses) adapt to the impacts of climate change and mitigation policies?

The eCLAT Network: 2003

eCLAT is trans-disciplinary research network which will include a number of stakeholder organisations.

Stakeholders and Policy Makers

Take the effects of mitigation policies into account when planning for tourism

Whilst some impacts of climate change may appear long-term, it is likely that the effects of climate change mitigation policies will be felt in the near-term.

Stakeholders, assess your own vulnerability to climate change!

Stakeholders need to be aware of their vulnerability to the direct impacts of climate change and indirect impacts.

Address the impacts on small island states and developing countries

For many small island states and developing countries tourism is an important means to generate economic growth. There is a need to investigate how emission reduction policies implemented by developed countries may raise the price of energy and transport, and thus have a negative impact on the number of tourists visiting developing countries.

Press the IPCC to give tourism a higher profile

To-date the Intergovernmental Panel on Climate Change (IPCC) has not yet addressed the issues that surround the interactions between climate change, the environment and tourism.

Tourism Industry needs to be aware of new opportunities

Whilst it may appear that climate change may pose many threats to the tourism industry it will also create new opportunities. The tourism industry, therefore needs to be aware of how changes in climate may develop new opportunities for tourism development.

The eCLAT Network: 2003

The Research Community

Identify the current baseline conditions

The identification of the current baseline conditions is a pre-requisite for the identification of any future changes and impacts.

Carry out assessment studies

There is a need to undertake studies to assess, identify and quantify the possible impacts of climate change on tourism, tourist destinations and tourist's perceptions.

Develop a database of indicators

There is a need to develop a database of indicators and Visual Observed Impacts to help provide advice and information to the stakeholder community (including individual tourists).

Develop and apply methodologies

There is a need to develop and apply methodologies that would enhance early warning for the impacts of climate change on tourism at all scales.

Develop and identify links with other organisations

Develop and identify links with: national and regional governments; international programmes (e.g., WTO, UNEP, IPCC etc.,) and stakeholder organisations.

Be consistent with the IPCC

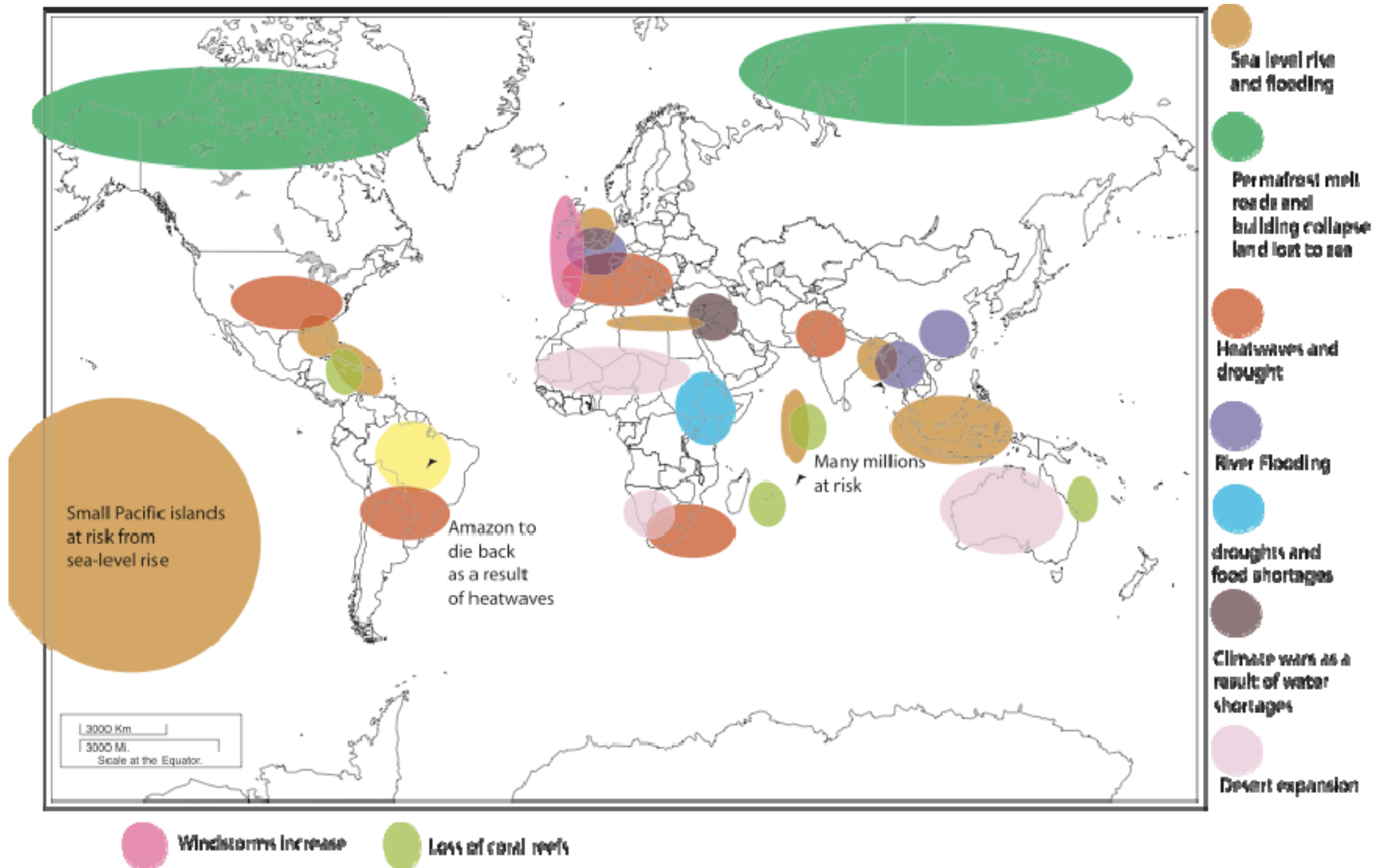
Future research that is undertaken should be in the context of, and be consistent with, the IPCC. That is, adopt the recommendations and make use of any guidance material and data provided by the IPCC.

Presentation Structure

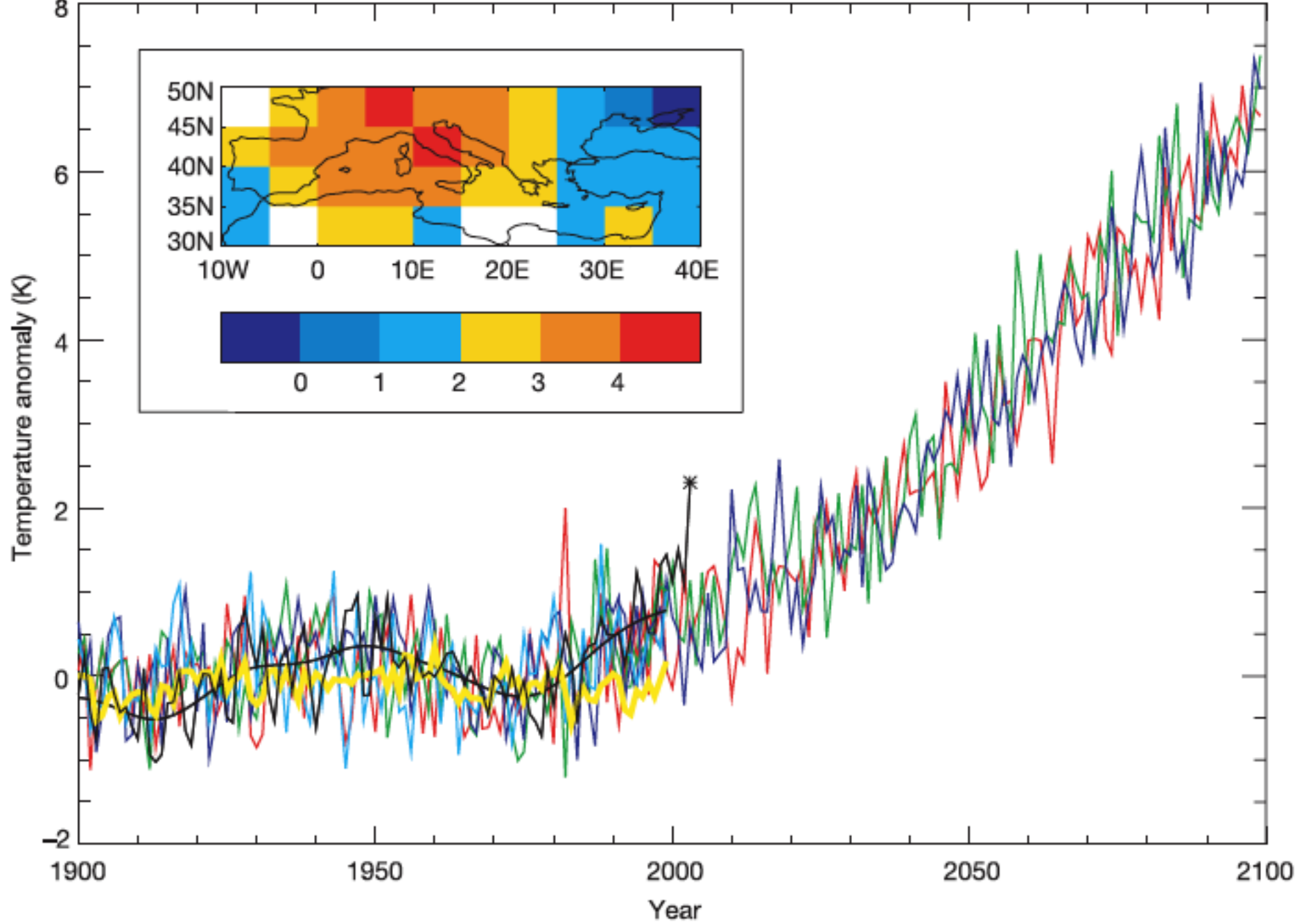
What has been done?



Climate Change Risk Assessment



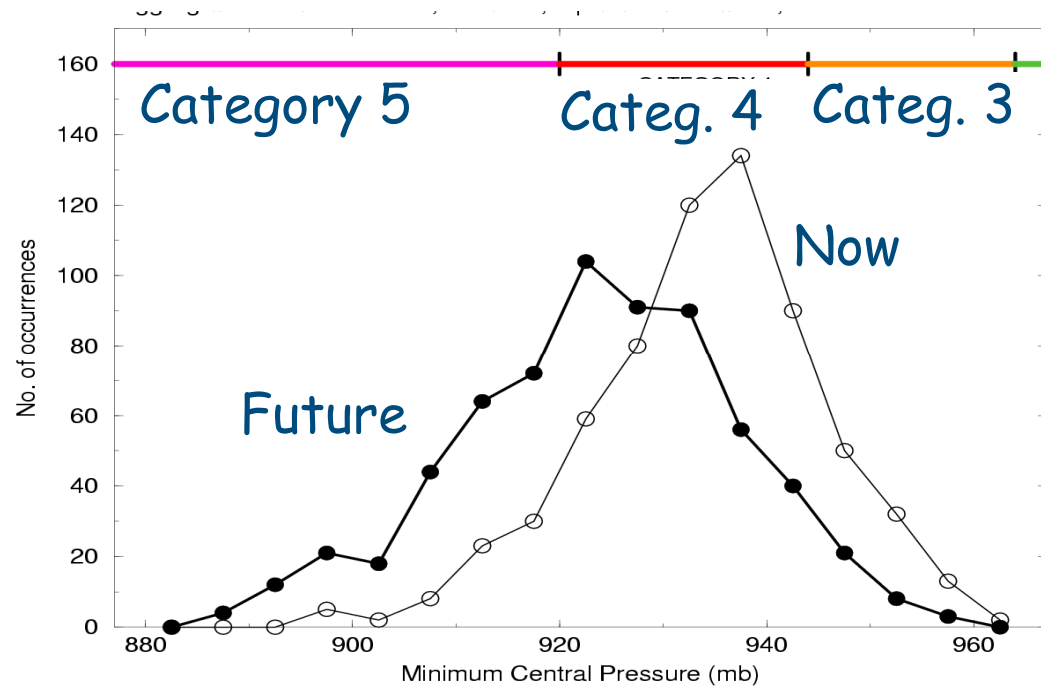
Observable impacts, impacts and extreme climate events



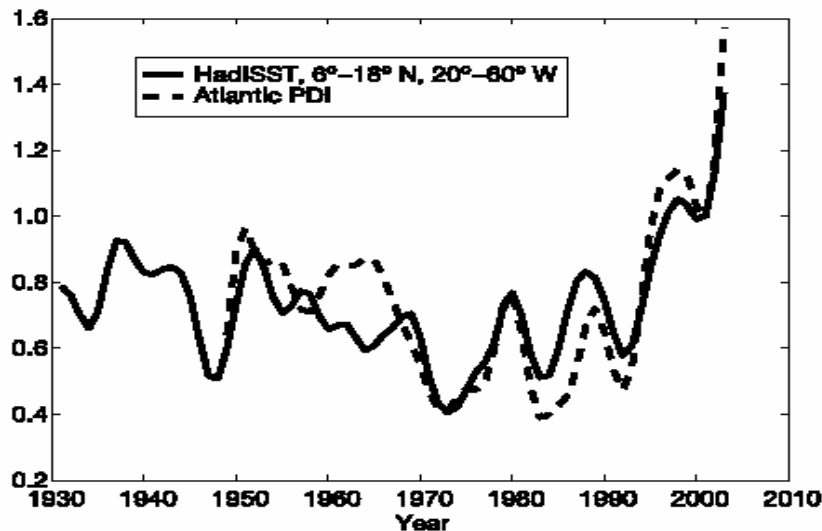
June–August temperature anomalies (relative to 1961–90 mean, in K) over the region shown in inset. Shown are observed temperatures (black line, with low-pass filtered temperatures as heavy black line), modelled temperatures from four HadCM3 simulations including both anthropogenic and natural forcings to 2000 (red, green, blue and turquoise lines), and estimated HadCM3 response to purely natural forcings (yellow line). The observed 2003 temperature is shown as a star. Also shown (red, green and blue lines) are three simulations (initialized in 1989) including changes in greenhouse gas and sulphur emissions according to the SRES A2 scenario to 2100²². The inset shows observed summer 2003 temperature anomalies, in K.

QuickTime™ and a
GIF decompressor
are needed to see this picture.

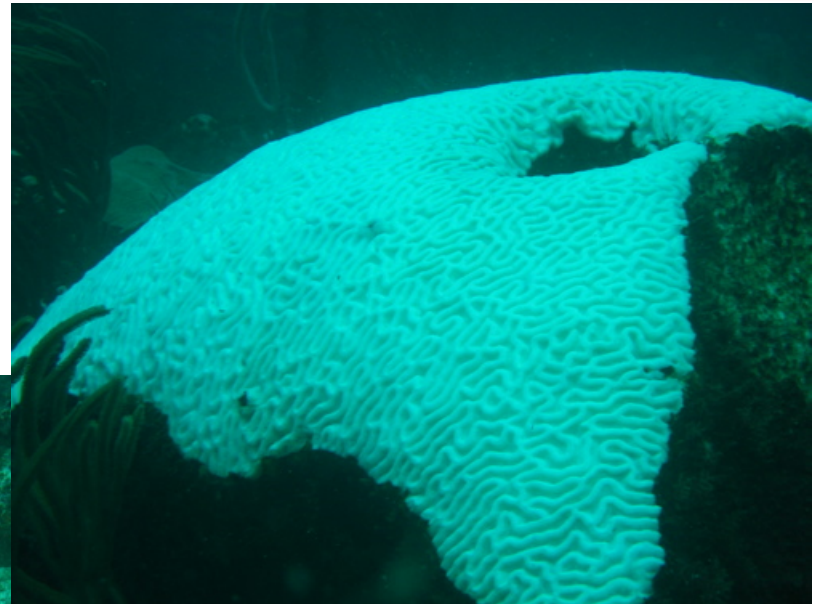
Hurricanes increase



Hurricane prediction models:
More intense hurricanes in warmer climate (GFDL Princeton)



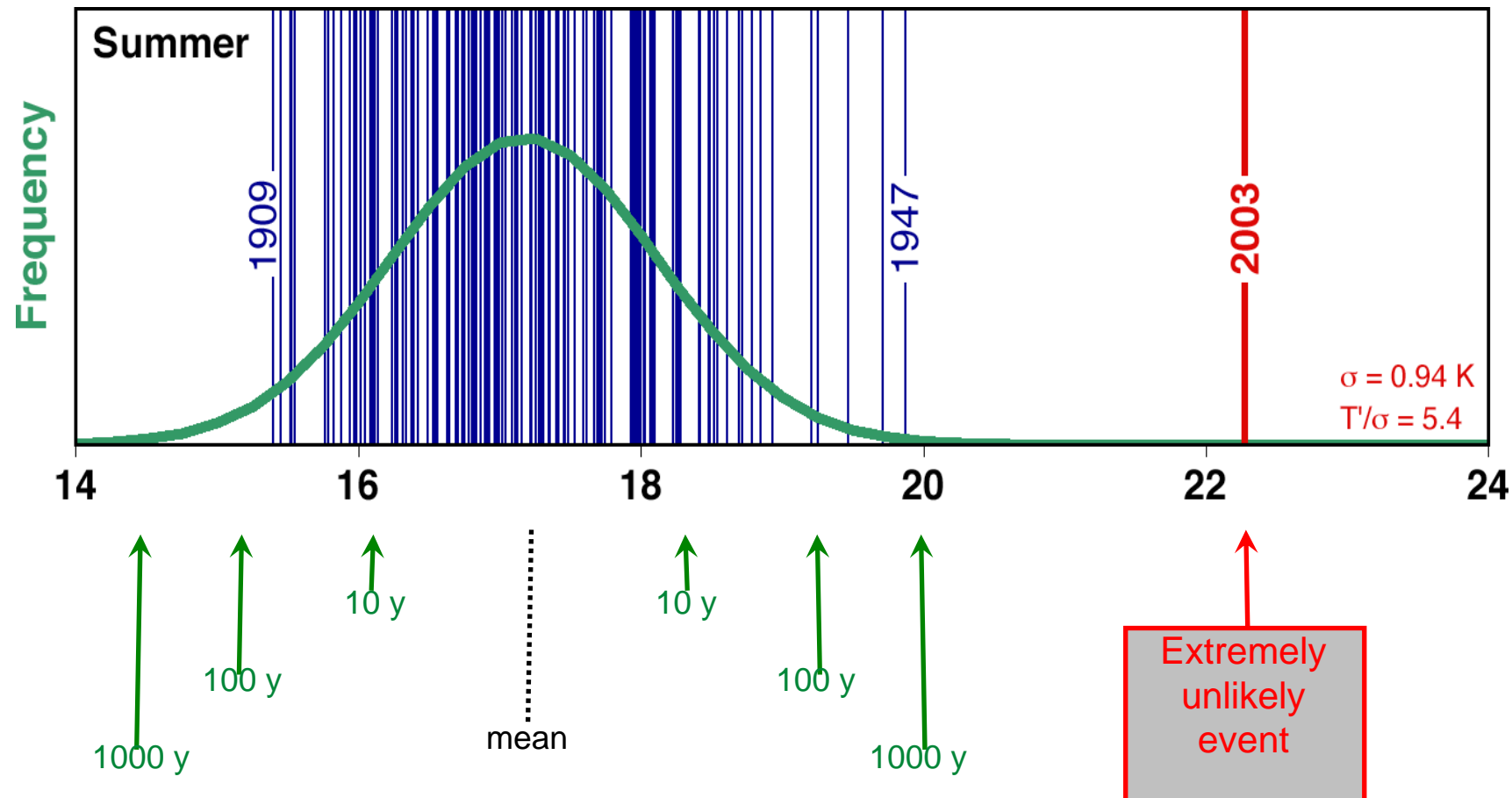
Observed data:
Hurricane energy closely linked to SST, and already increasing (K. Emanuel, MIT)



Photos, Simpson
Camera, Viner

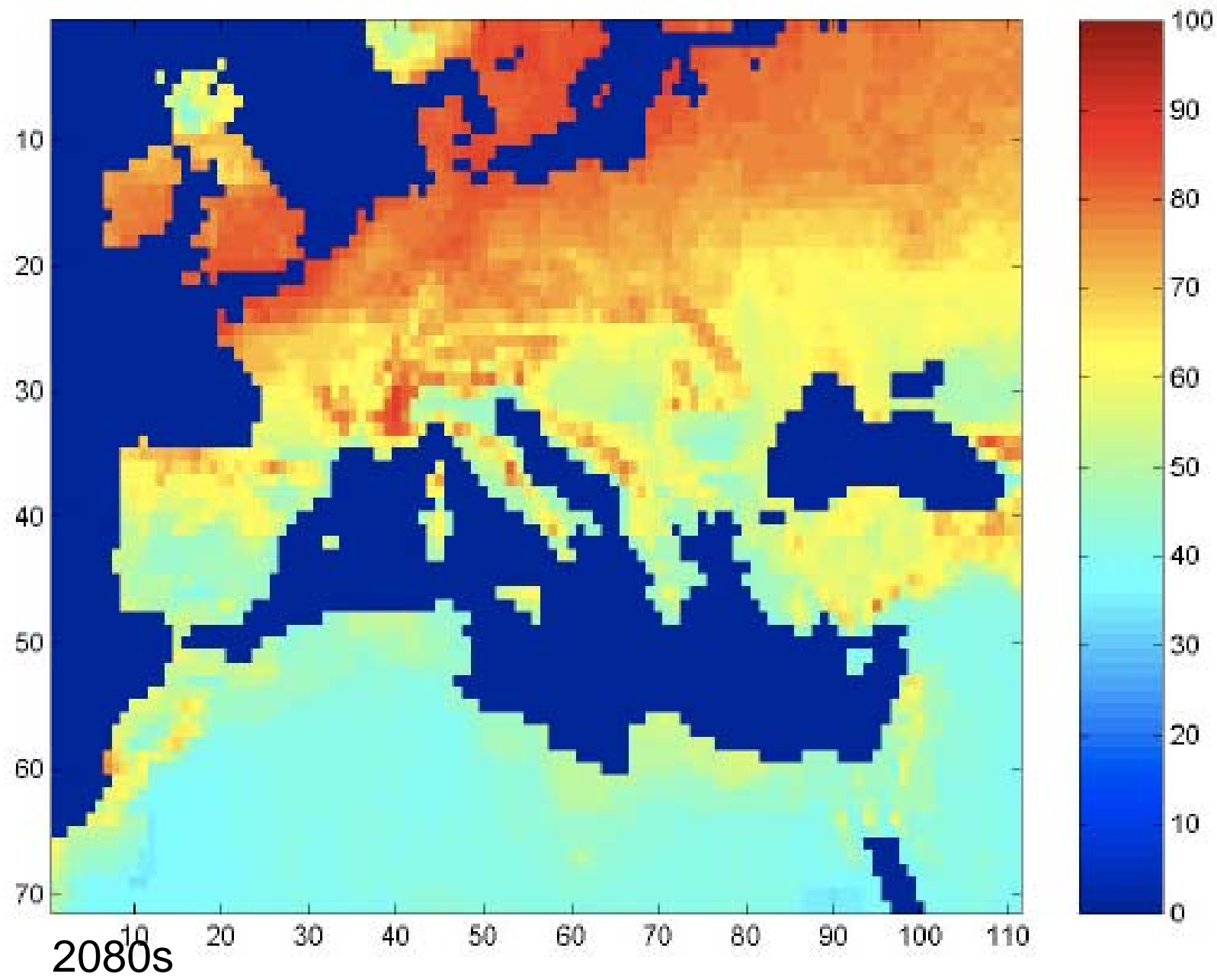
Swiss Temperature Series 1864-2003

Estimation of Return Periods



(Schär et al.
2004, *Nature*,

However the impacts of extreme climate events on tourism and their future impacts have not been fully addressed



Tourism Comfort Index, Summer (JJA)

The Tourism Comfort Index - TCI

A refined version of Mięczkowski (1985) Index

Uses:

Mean temperature; Maximum temperature; Vapour Pressure (humidity); Total precipitation (rainfall); Sunshine hours; Wind.

The TCI can be constructed for a given site, region or the world.

Provides an exceptionally powerful tool for demonstrating the future changes in tourism, well accepted by policy makers and the industry.

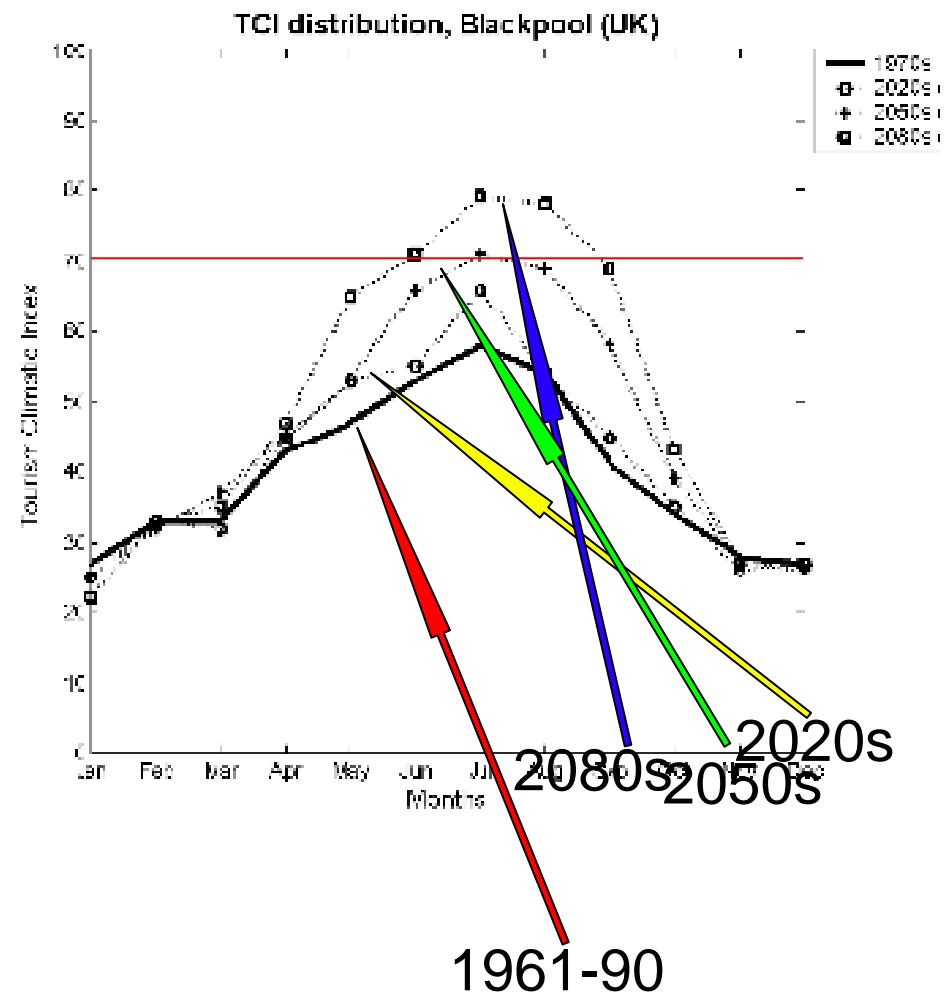
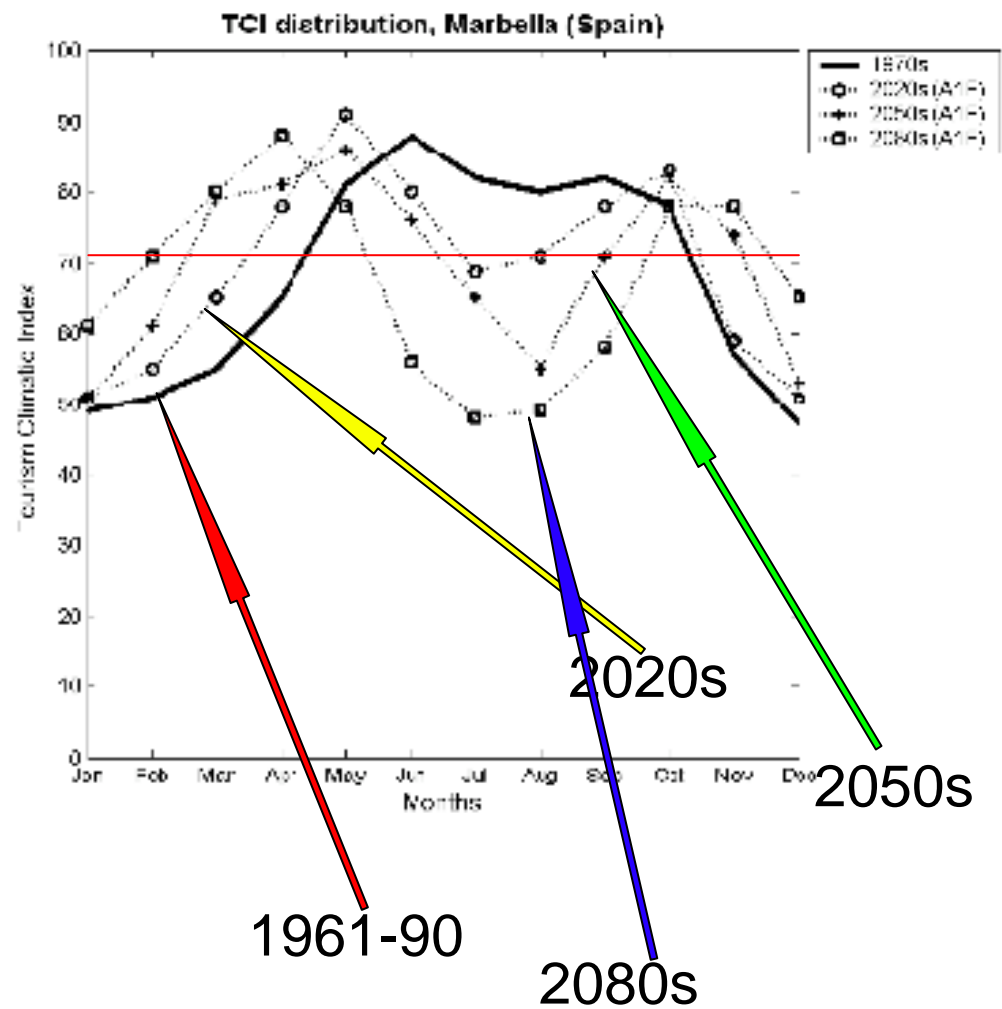
Used as a CC Indicator in many studies, IPCC, UK, MCCIP, EEA etc.

Widely accepted by policy makers etc.

Media friendly, numerous appearances on the telly!

Bas Amelung!





Data: Major International Flows (millions)

What else?

Quality, consistency?



Source: Travel Research International from World Tourism Organization data

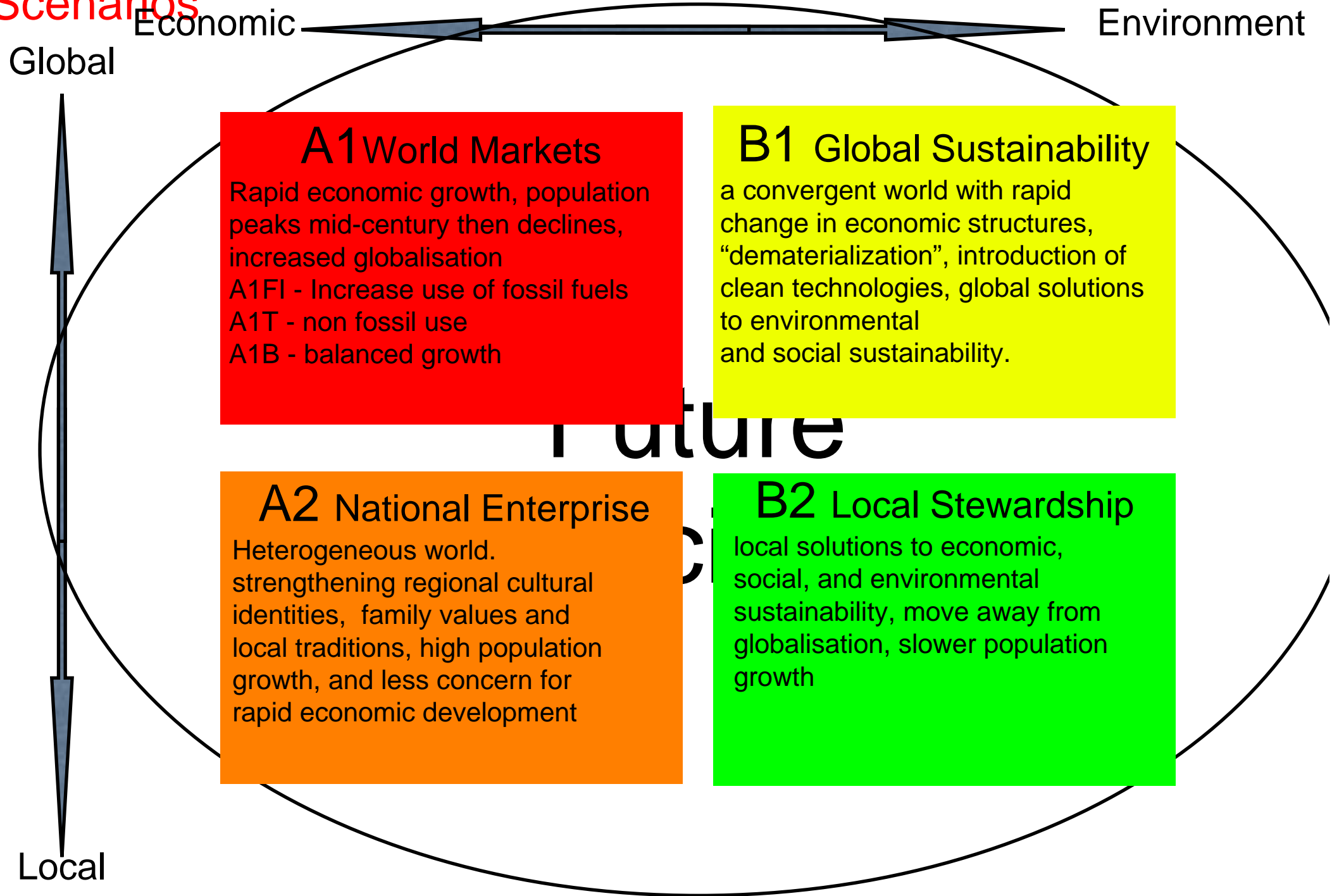
Climate change and interactions with
socio-economic changes.

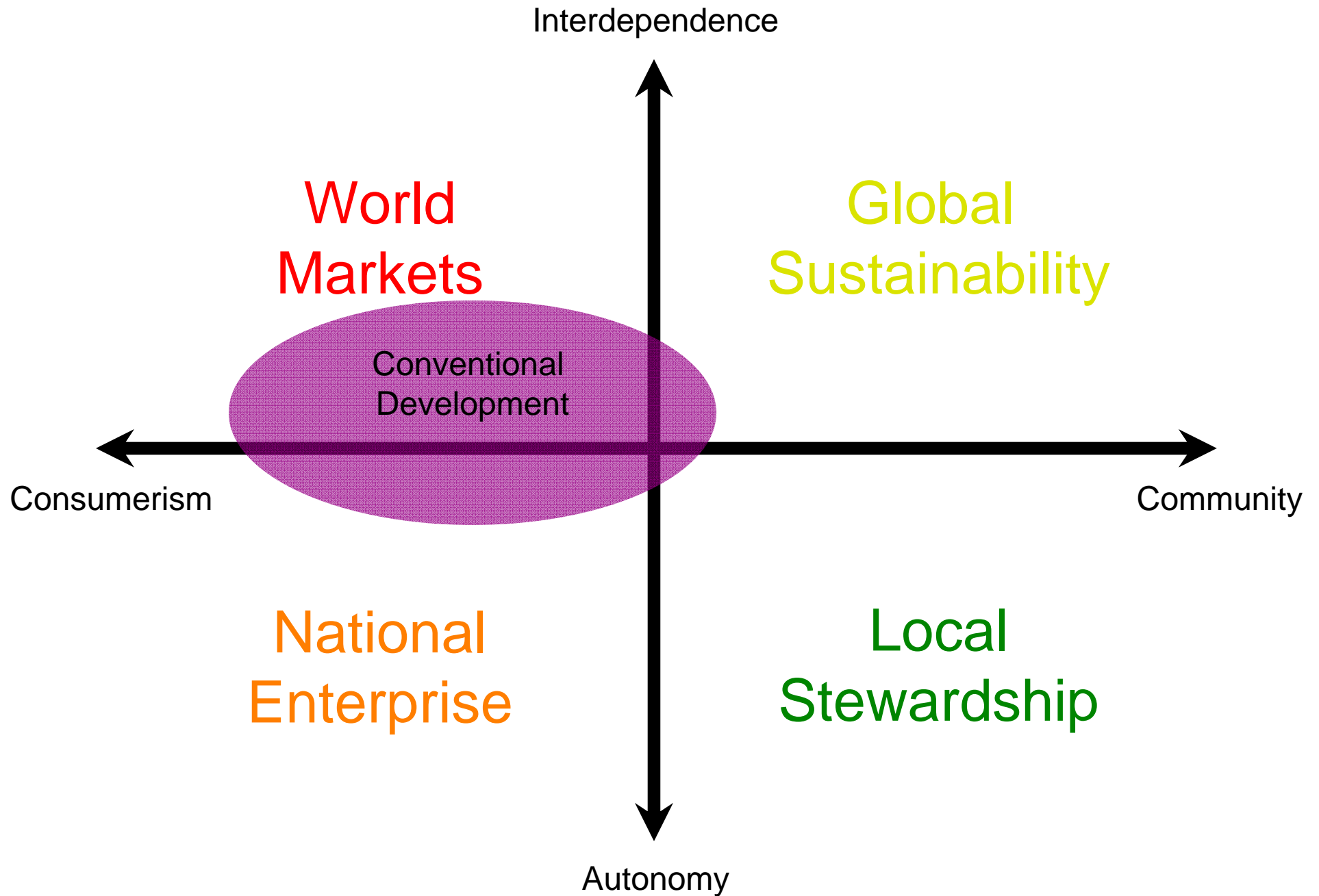
How will tourism change?

How will the interactions evolve?

Are projections of tourism growth valid?

Future Development: The SRES Scenarios





Global Changes and Tourism

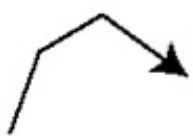

























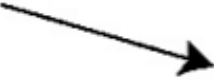


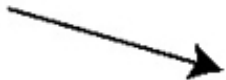





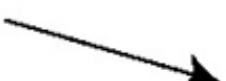
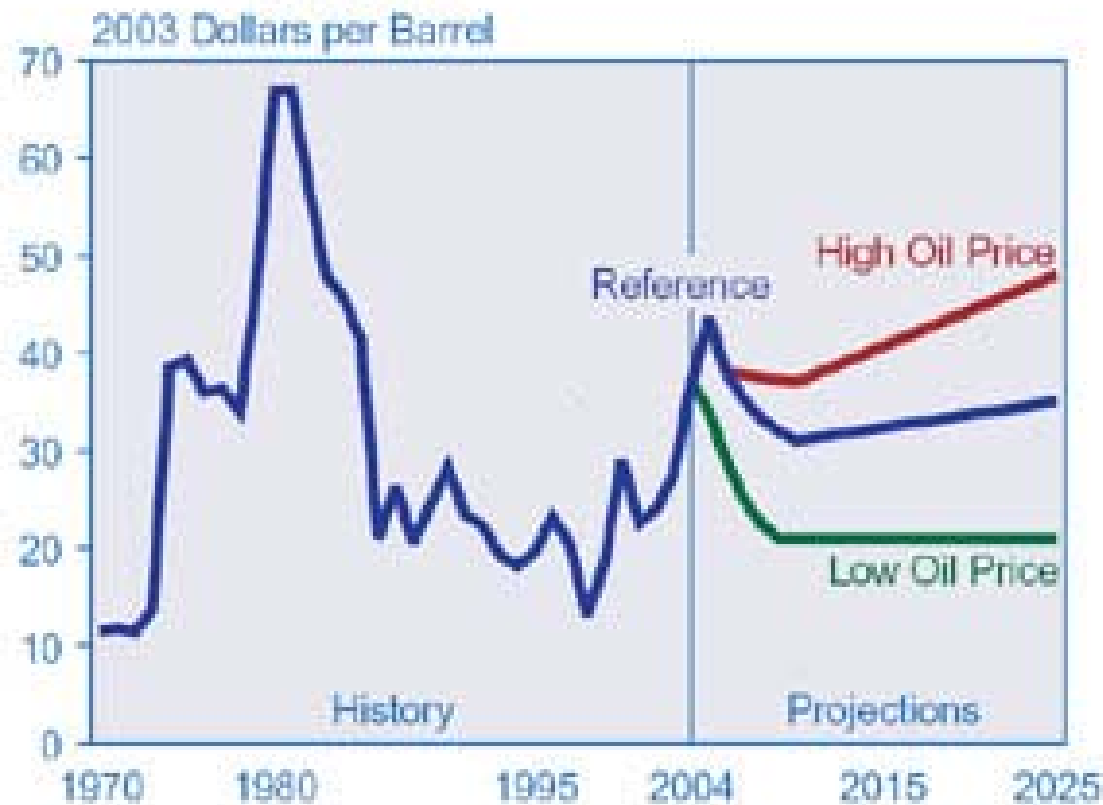
Scenario	Population	Economy	Environment	Equity	Technology	Globalisation	Tourism
AIFI							+ve -ve
AIB							+ve -ve
AIT							+ve -ve
B1							+ve -ve
A2							+ve -ve
B2							+ve -ve

Figure 30. World Oil Prices in Three Cases, 1970-2025



Sources: **History:** Energy Information Administration (EIA), *Annual Energy Review 2003*, DOE/EIA-0384(2003) (Washington, DC, September 2004), web site www.eia.doe.gov/emeu/aer/. **Projections:** EIA, *Annual Energy Outlook 2005*, DOE/EIA-0383(2005) (Washington, DC, February 2005). Note: *IEO2005* uses the *AEO2005* October oil futures case as its reference case.

Oh! and some Economists criticise climate scientists!!!

Impacts on the UK

A1- World Markets

Tourism & Leisure

Few constraints on international travel

Domestic travellers more inclined to go overseas

Low fuel prices, so jet-skiing, power boating, etc. increase

Warmer climate leads to UK resorts becoming more attractive

Competition between resorts for investment & development

Resorts become more homogeneous

Inputs & Run-off

River water quality deteriorates

Agricultural policy non-interventionist, subsidies reduced

Technology may allow higher yields with targeted fertiliser inputs, or

Cheap fertiliser prices may encourage indiscriminate usage

Inputs of metals and contaminants decline as manufacturing declines

Low fuel prices mitigate against expansion of nuclear power

Radioactive emissions decrease

Impacts on the UK

A2 National Enterprise

Tourism & Leisure

Focus on national identity and local communities

Increased visitation by domestic tourists to UK resorts

Growth of traditional activities, boating

Strong emphasis given to the regeneration of resorts

Role of local authorities & tourist boards are enhanced

Inputs & Run-off

River water quality deteriorates considerably

Only 50% river water classed as good chemically, 85% 'good' biologically

High inputs of nitrogen and phosphorous fertilisers

Environmental protection is weak and pesticide use increases dramatically

Manufacturing industry declines less, therefore continued inputs

Radioactive emissions continue

Impacts on the UK

B1 Global Sustainability

Tourism & Leisure

Heavy taxes on fuel, discourages overseas travel

More UK residents visit coastal resorts

Less powered activities, more focus on 'ecotourism'

Increased demand for blue-flag beaches and better standards

Inputs & Run-off

River water quality improves dramatically

75% river water as good chemically, 95% 'good' biologically

Reduced pesticide inputs & shift to cleaner production in industry

Stringent water quality standards, necessitating improved water treatment

Levels of metals and contaminants decline

High levels of environmental control lead to phasing out of nuclear energy

Impacts on the UK

B2 Local Stewardship

Tourism & Leisure

Focus on local identity

Unique selling points of destinations heavily drawn upon

Increased visitation by domestic tourist to UK resorts

Destinations will provide more 'eco-friendly' activities

Development in-keeping with existing natural landscape

UK residents support seaside towns of yesteryear

Co-operatives and joint ventures encourage development

Inputs & Run-off

River water quality improves dramatically

65% river water classed as good chemically, 95% 'good' biologically

Low-intensity farming practices

Stringent water quality standards, necessitating improved water treatment

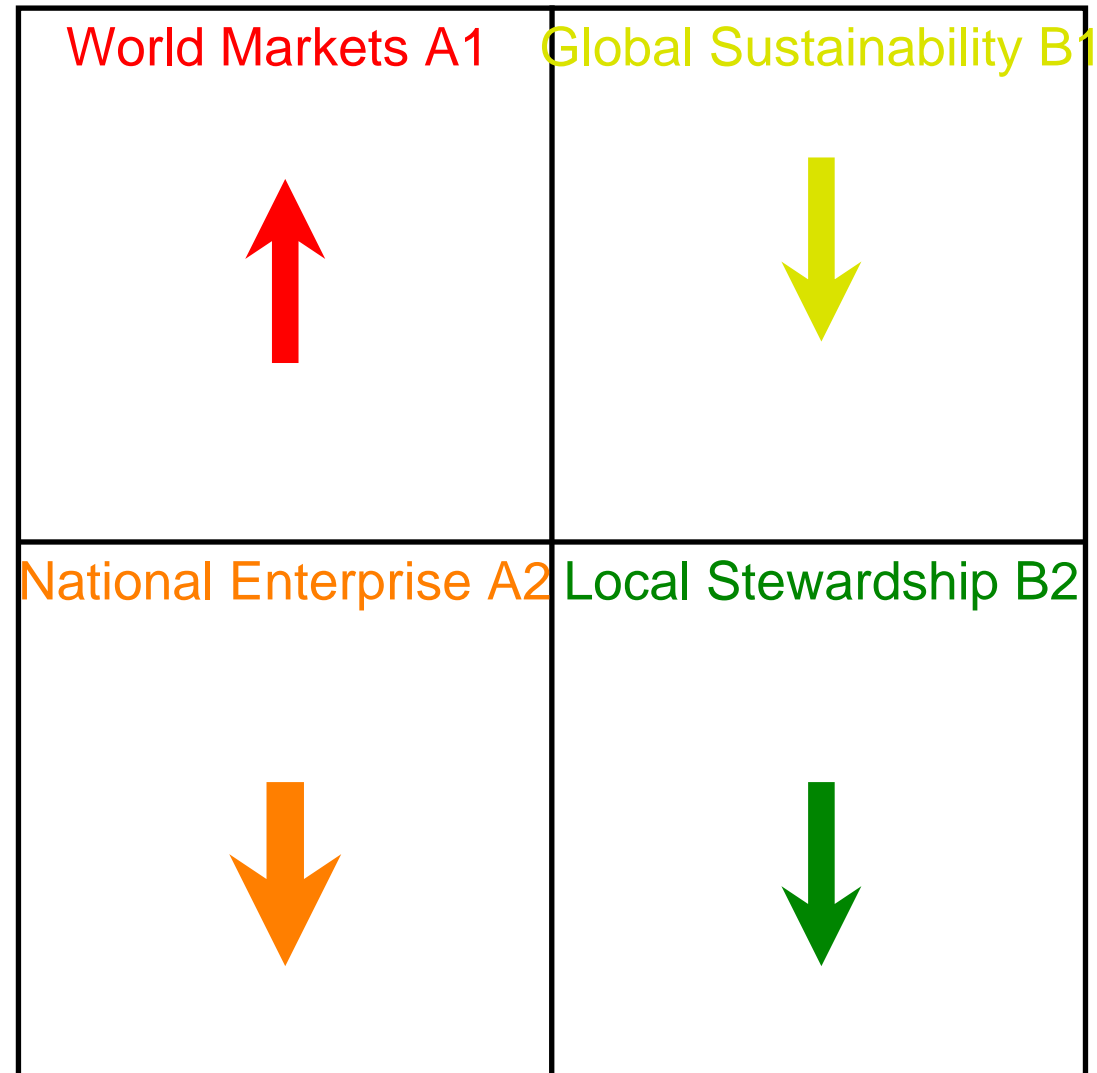
Levels of metals and contaminants as manufacturing declines

High levels of environmental control lead to phasing out of nuclear energy

Decrease in emissions of radioactivity to marine environments

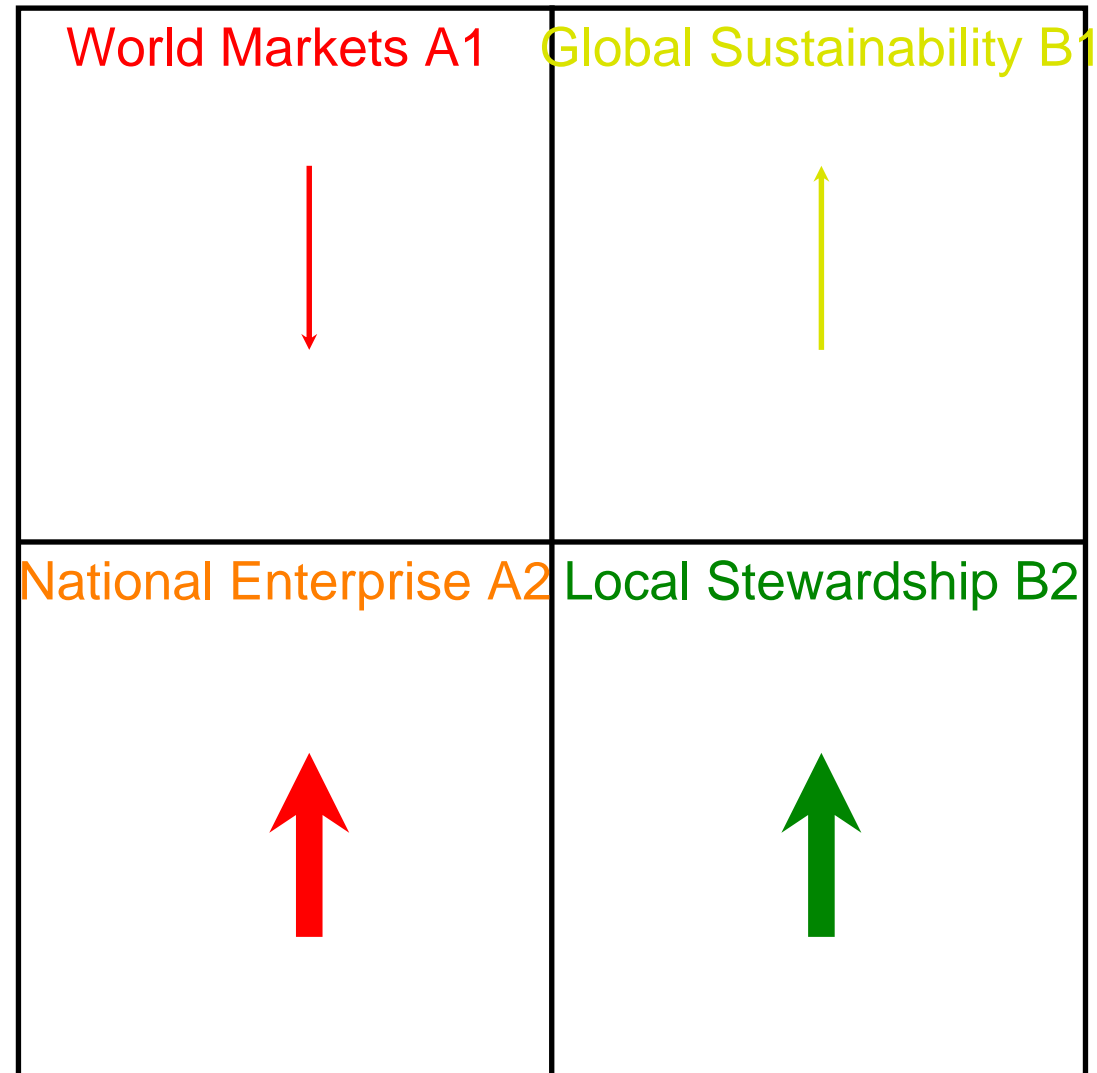
Impacts on the UK:

Tourism: Domestic to Overseas



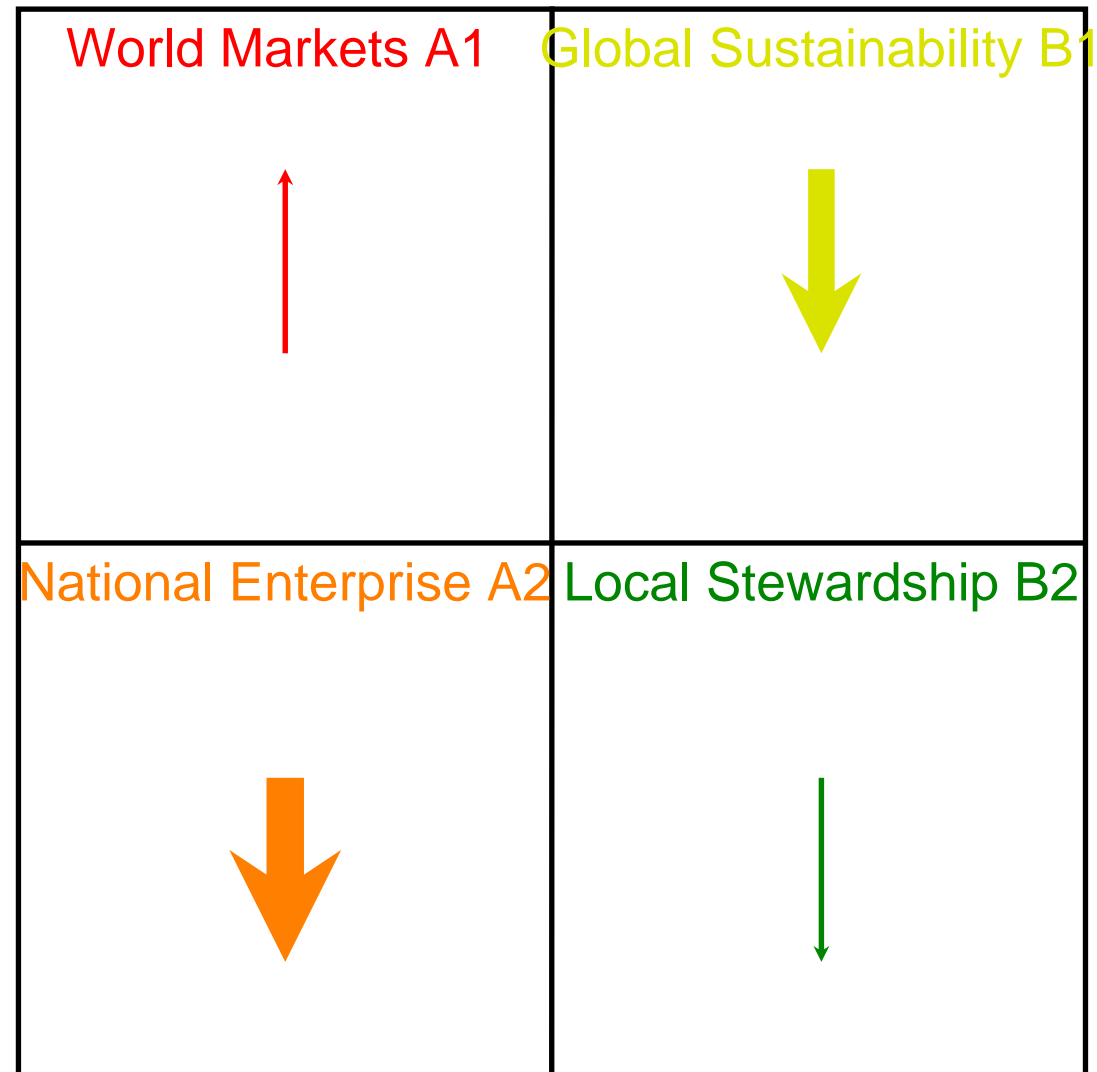
Impacts on the UK:

Tourism: Domestic to UK



Impacts on the UK:

Tourism: International to UK



Case Studies: Impacts, Adaptation and Mitigation

Fiji

Tobago, Caribbean

Grenada, Caribbean

Are, Sweden

Le Grande Bornand, France

Torbay, England

North Norfolk, England

Kathmandu, Nepal

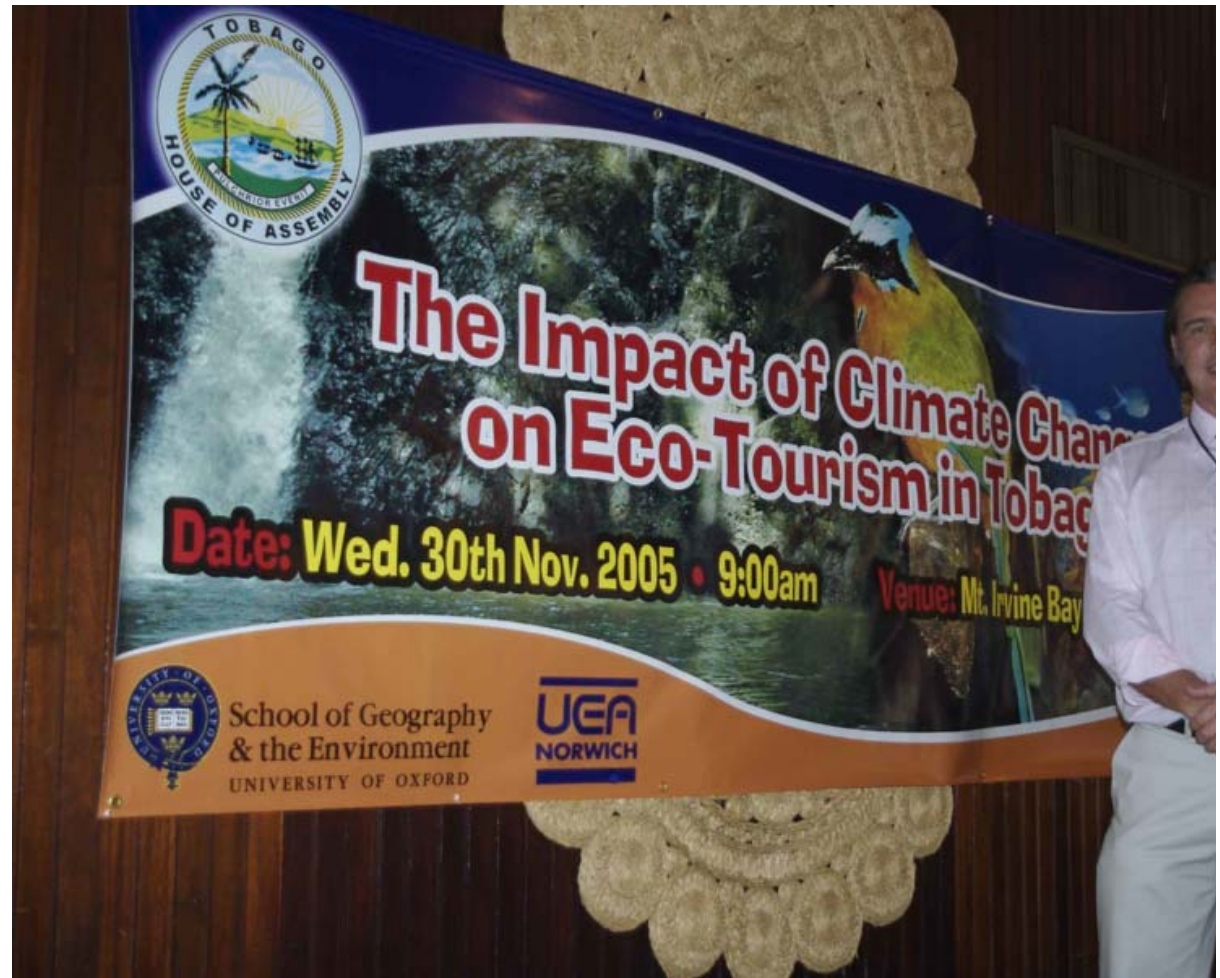
Canada

France

PESETA (EU).

Bonaire, Barbados

A number others have been undertaken elsewhere.





Assessing Knowledge and Risk Perception of Tourists on Climate Change: Grenada

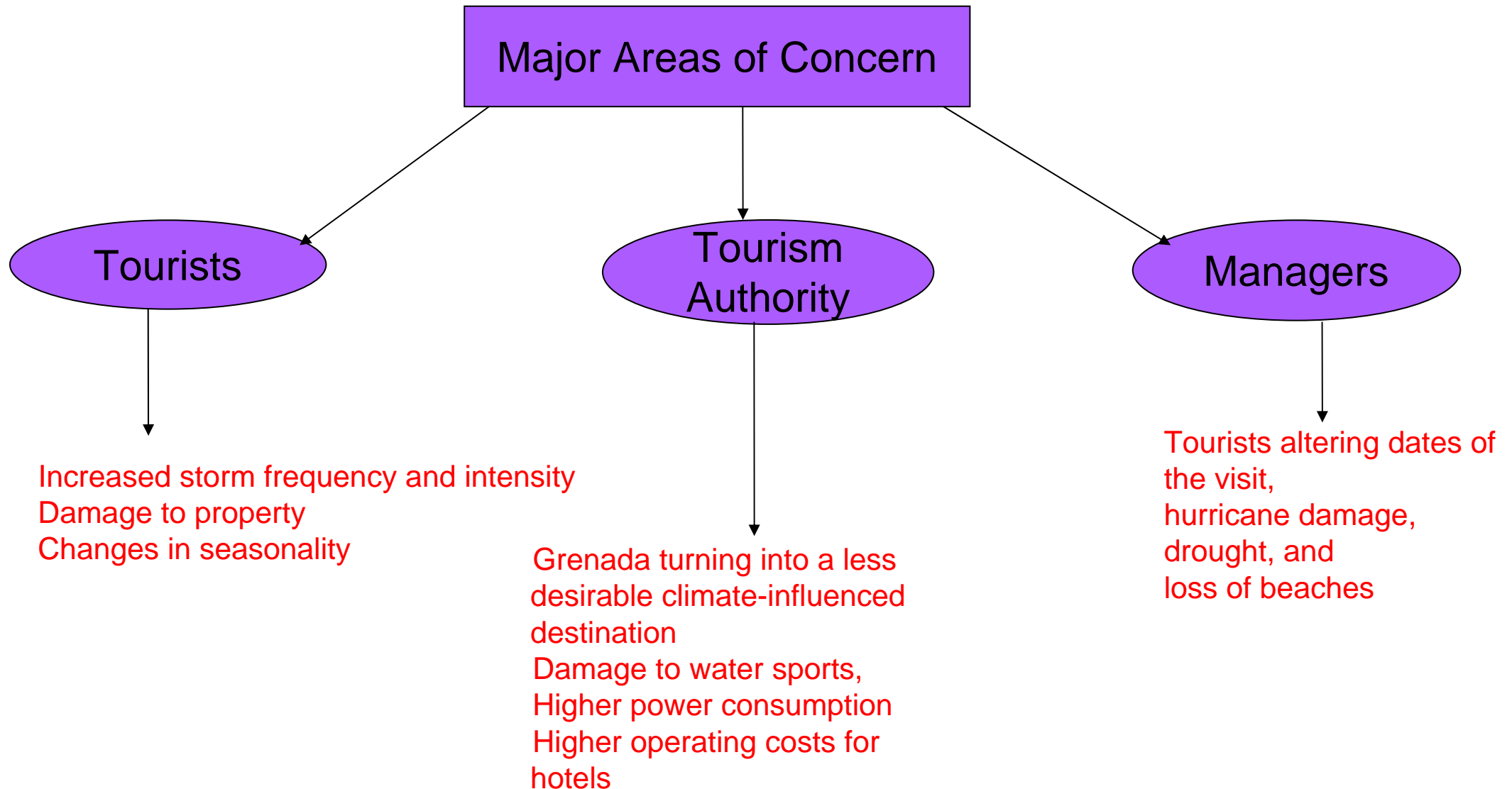
92% of the surveyed tourists aware of climate change

Climate Change impacts perceived as

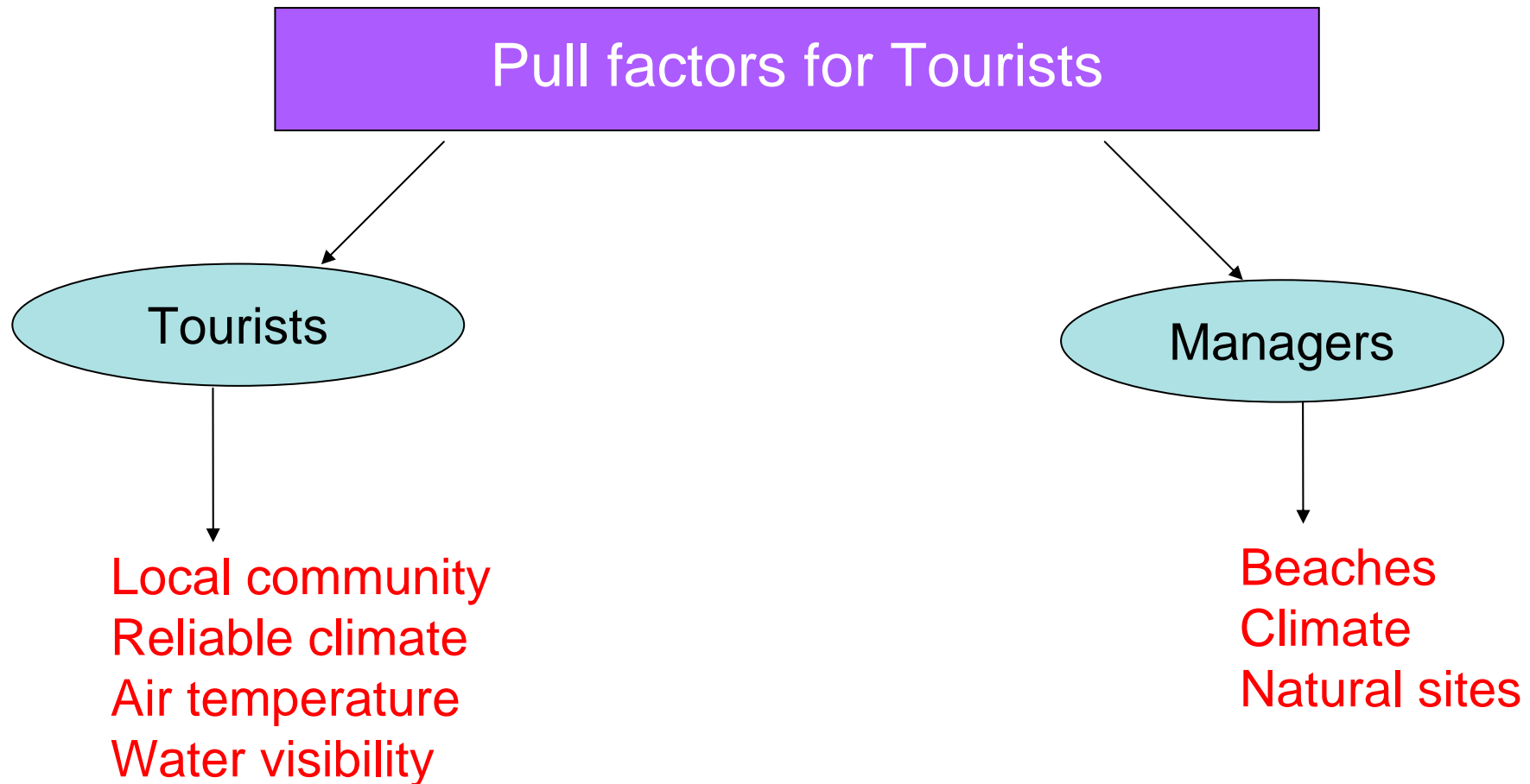
most important globally but

less of an issue for Grenada and even less for the tourism industry

Assessing Knowledge and Risk Perception of all Respondents on Climate Change



Climate Change and Tourism Preferences



‘Pull factors’ consistent to those identified in studies on other SIS’s

Seasonality of Sweden's Tourism Industry

Winter tourism accounts for

- 76% of overnight stays

- 85% of tourism expenditure in the Swedish mountains

Summer tourism declined by 15% over the last 30 years

Investments largely on winter tourism

The industry experiences strong seasonality with February –April being the peak season

Total visitor nights averaged around 200,000 since 2003 for February and March

A second peak of around 120,000 visitor nights occur in July

Perceptions and Awareness of Climate Change: Sweden (1)

68% businesses rated their knowledge on climate change as moderate or high

In general, the main concepts of climate change are understood such as potentially warmer winters altering winter season length

53% have been affected by climate change impacts

The dominant choices of impacts indicate a perceived deterioration of winter snow cover

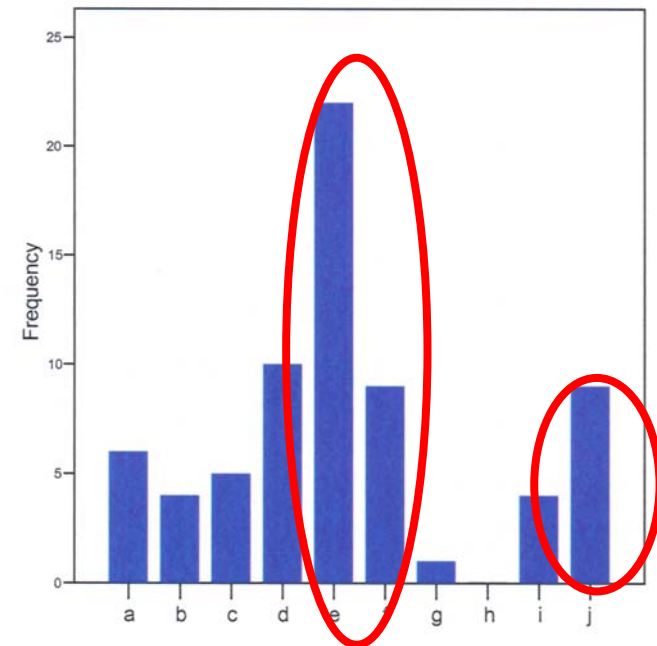


Figure 9: The number of businesses affected by the following climate change impacts:
a) increased storm frequency, b) increased storm intensity, c) avalanches, d) damage to property due to climate, e) snow shortages, f) increased temperature, g) changes in habitats, wildlife populations, h) drought, i) flooding, j) changes in seasonality.

Perceptions and Awareness of Climate Change (2)

63% view climate change as being a long term problem to be considered on a time scale of 6 years or more

Factors affecting business due to impacts of future climate change

- Lack of snow

- Warmer winters

Only 2% listed factors that could be interpreted as positive

- Increased number of people willing to live in the area due to improved climate

- Changing vegetation zones

12% thought climate change will never affect their businesses

Barriers to Adaptation Measures

Cost of implementation(34.2%)

Lack of measures(26.3%)

No need for measures (29%), in particular, by accommodation providers

Lack of time and trained staff

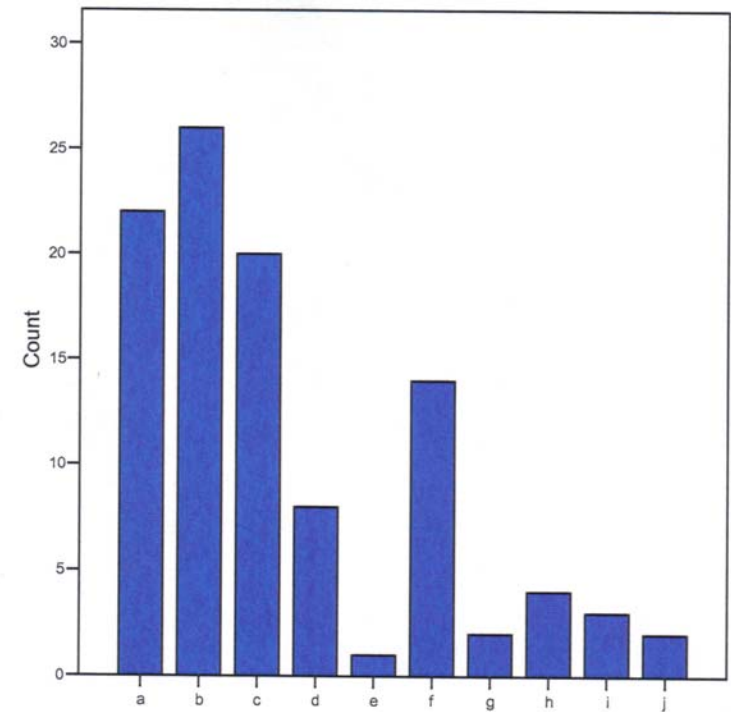


Figure 11: Barriers preventing implementation of adaptation measures/action to climate change. a) No need for any measures/action, b) cost of implementing changes, c) Lack of knowledge, d) lack of skilled staff, e) lack of legislation that requires compliance, f) lack of time, g) lack of government incentives, h) lack of recognition on part of customers, i) not interested, j) customer expectations prevent specific measures/action.

Efforts expected from the Government

43% wished the government organised education and training sessions of climate change related issues

This is potentially the cheapest and most viable of all options

33% valued development of a locally sustainable economy

30% thought financial incentives as best options

91% interested in receiving knowledge on climate change and tourism

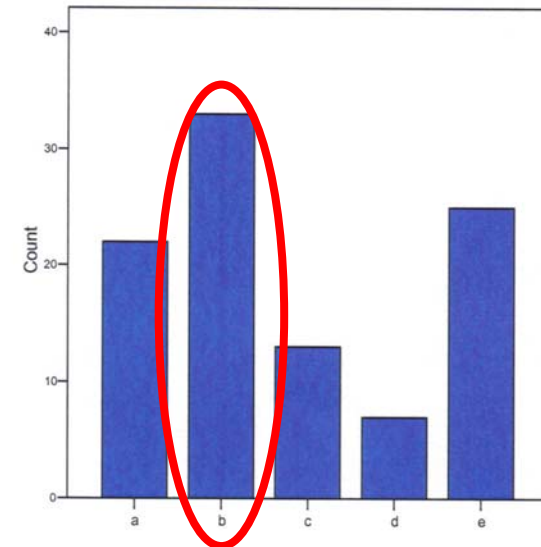
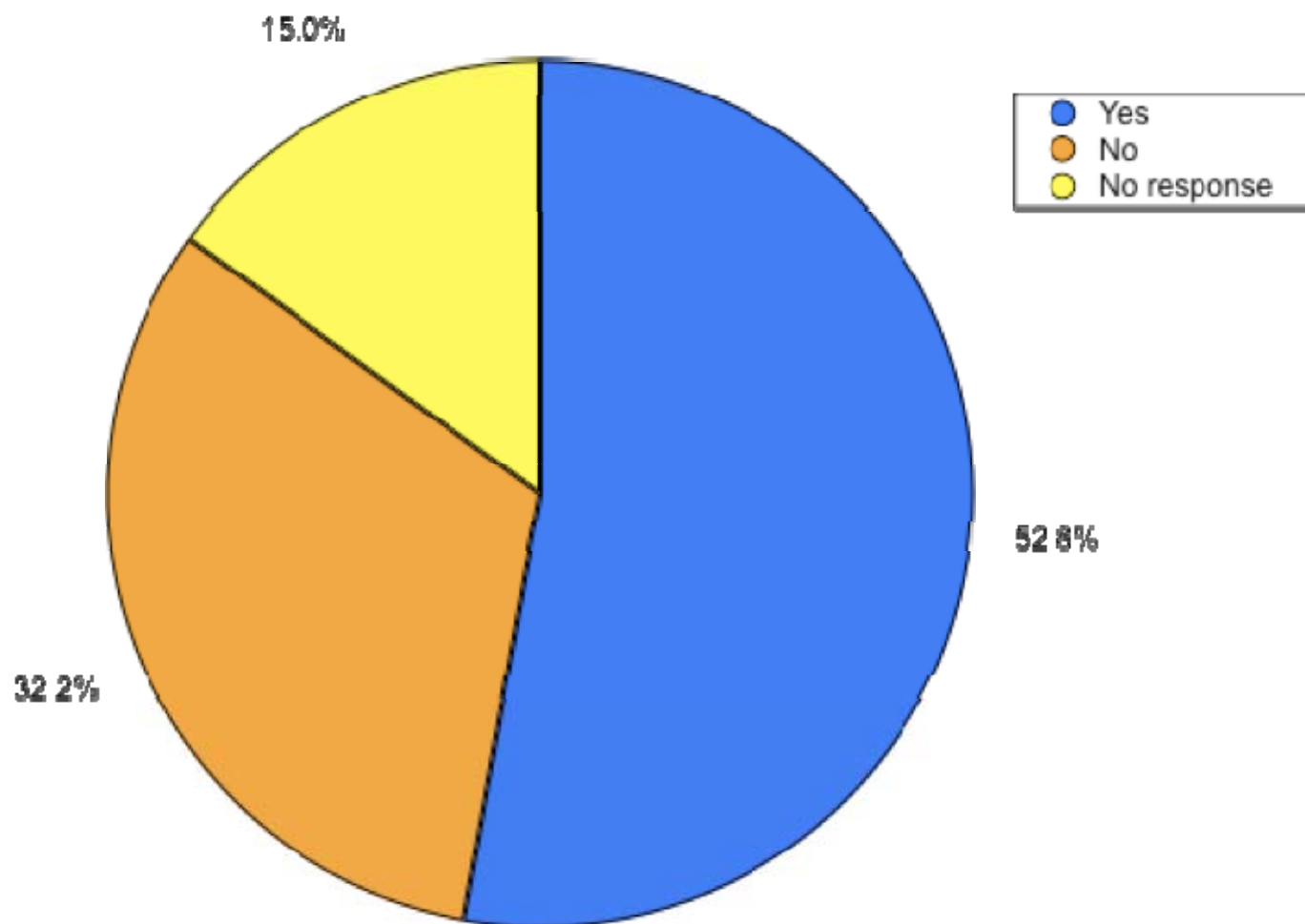


Figure 12: If you could choose a point that the local/national government could do about climate change what would it be? a) financial incentives/subsidies, b) education/training, c) more proactive attitude, d) help with building planning, e) support a local sustainable economy.

Awareness and Adaptation - UK



Awareness of the concepts of adaptation and mitigation of climate change

The eCLAT Network: Progress to date

The Research Community

Identify the current baseline conditions

3/10, some good localised studies

Carry out assessment (impacts, adaptation, and mitigation) studies

2/10, a collection of published results, no global assessments, limited number of regional assessments, limited influence on policy.

Develop a database of indicators

2/10, some progress, one or two notable successes

Develop and apply methodologies

2/10, consistency amongst the case studies performed to date, using single methodology

Develop and identify links with other organisations

4/10, some strategic partnerships built, notably WTO, a few key links with industry organisations eg., FTO, and limited number of personal links with industry.

Be consistent with the IPCC

6/10, use of SRES, GCMs, high quality observational datasets, some poor exceptions!

Communication and awareness raising

5/10 A few books, JOST. This is a fashionable and trendy subject, media are always interested in this issue

Stakeholders and Policy Makers

Take the effects of mitigation policies into account when planning for tourism

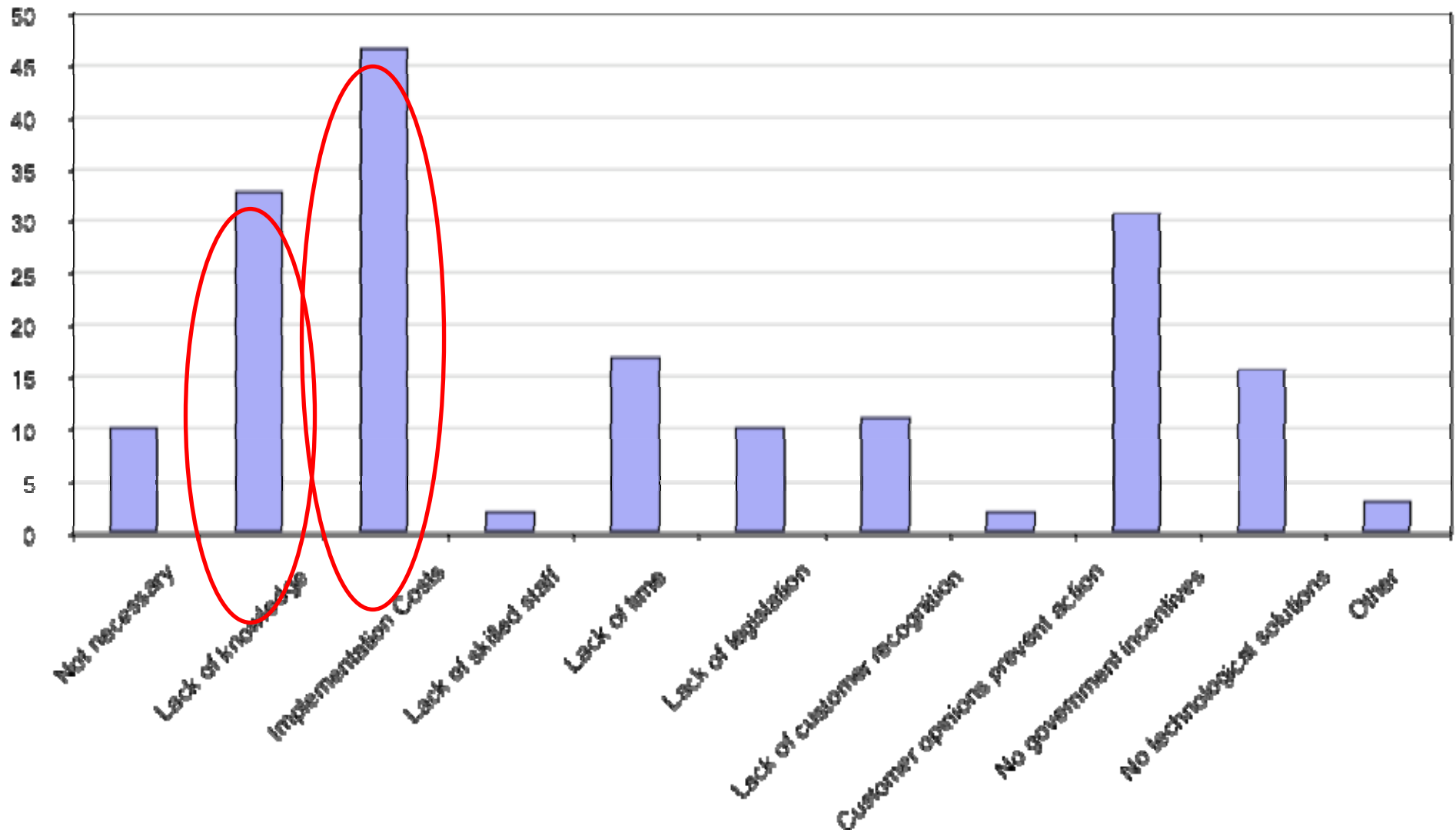
Stakeholders, assess your own vulnerability to climate change.

Address the impacts on small island states and developing countries

Press the IPCC to give tourism a higher profile

Tourism Industry needs to be aware of new opportunities

Results — Barriers to Adaptation



Presentation Structure

The Future: i.e. from now on



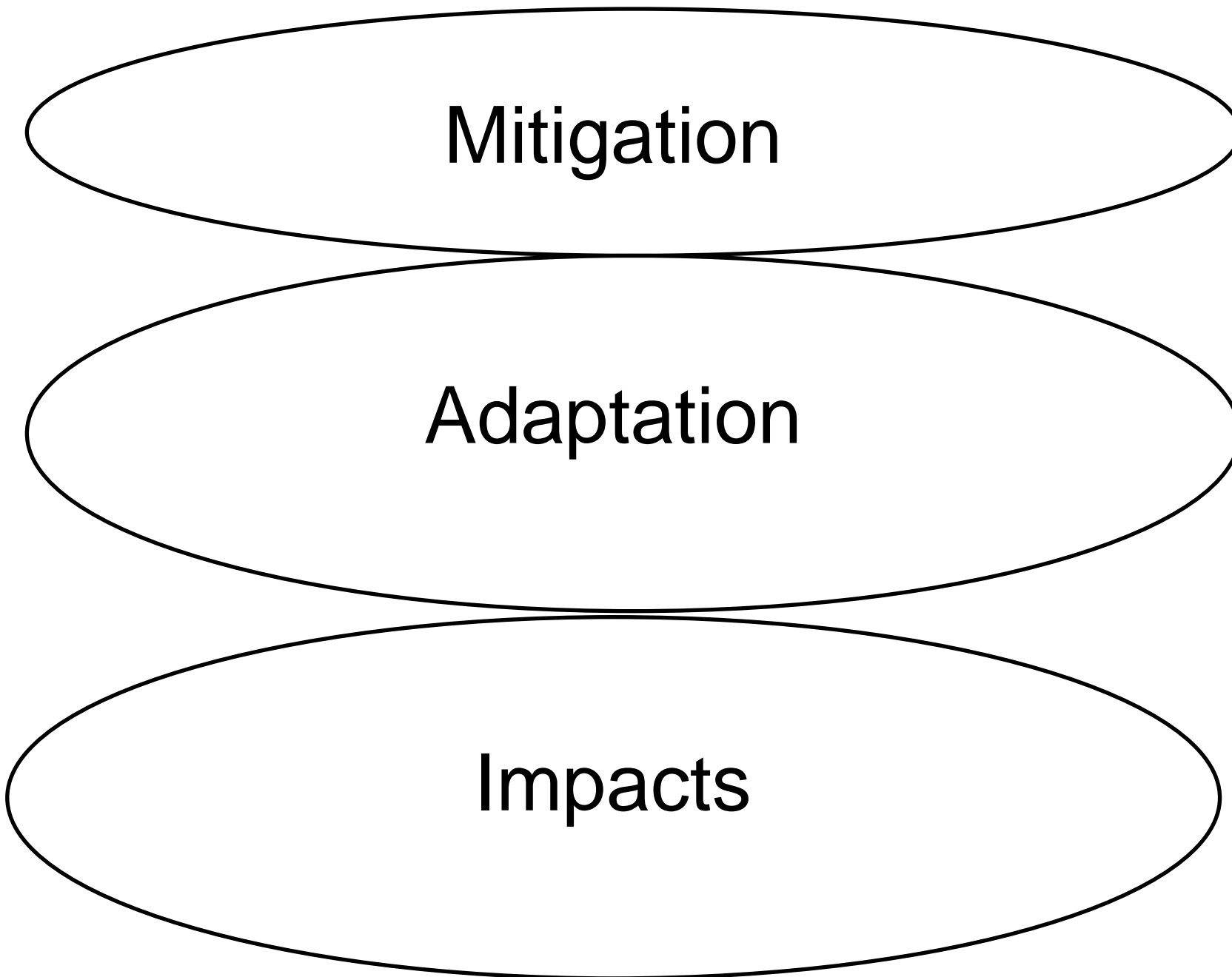
Discussion: Circa 2003

Climate Change Impacts occur as a result of a number of complex relationships: There is a need to identify the interrelationships at individual locations; Need to take into account wider issues (i.e social changes, impacts elsewhere, etc.).

There is a need for adaption at all scales, in terms of political; societal; and physical structures.

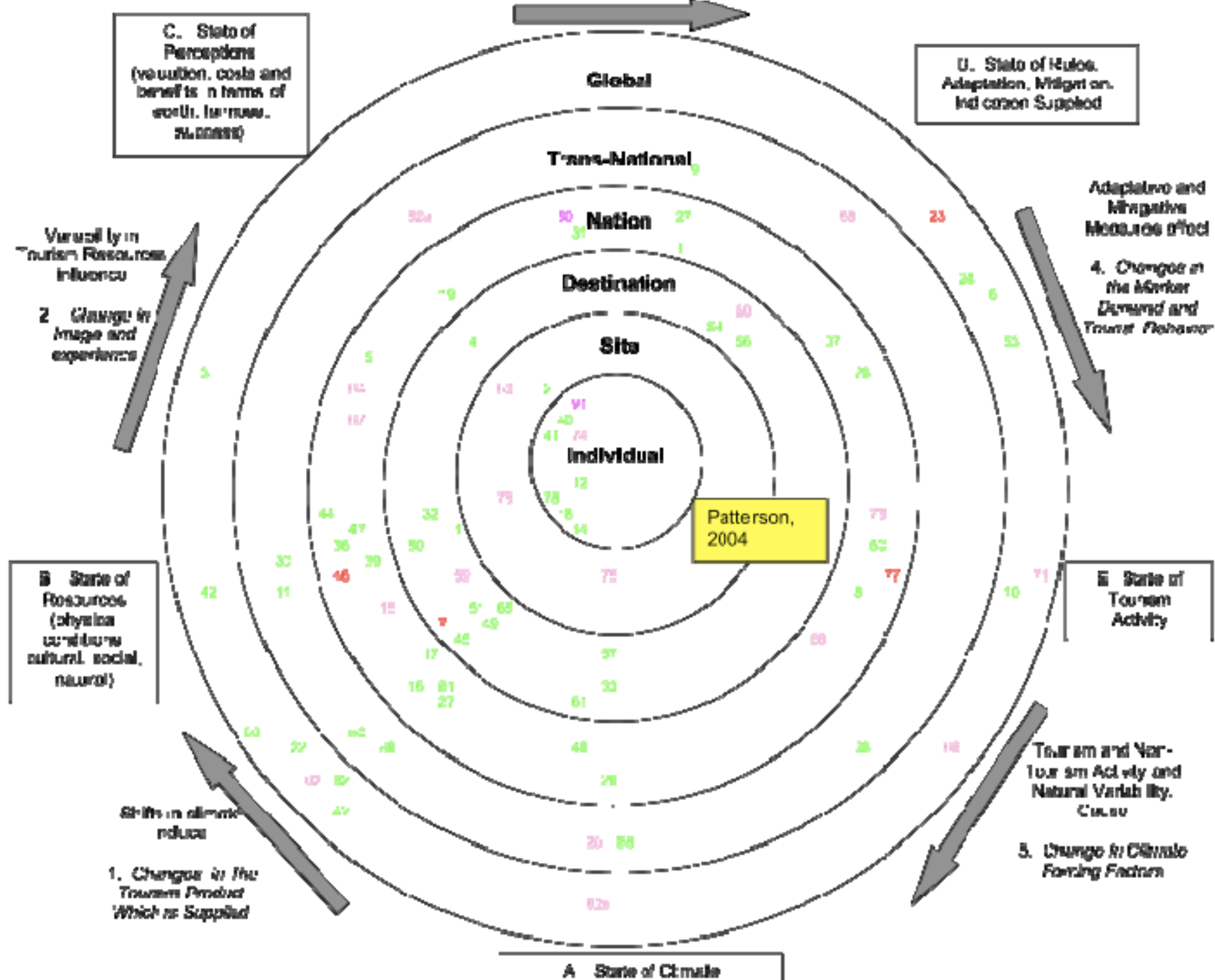
There is a pressing need for the implementation of joined up climate change mitigation and adaptation policies at all levels.

CO-ORDINATION



Strategy

Monitoring and Data Collection



The Future, Driving the Agenda

Influence the funding Agencies

This is a prerequisite to run and produce the research, need comprehensive national, regional and global assessments that are published in the scientific literature.

Raise awareness

Industry, stakeholders, policy makers, public, regional authorities: Use the media, promote published work

Develop strategic alliances with all sectors of the industry

Develop links with business, industry organisations etc, develop constructive partnerships with industry at all scales.

Develop strategic alliances with stakeholders

Maintain links with WTO etc, develop partnerships with stakeholders and policy makers.

Develop constructive partnerships with other scientists: The eCLAT Network.

In a relatively small community share resources and ideas, motivate the traditional navel gazing tourism research community.

DO NOT deal with the pseudo scientific sceptic(s)

The IPCC

CC a T provides a great cross cutting theme: atmospheric science, terrestrial, marine, impacts adaptation, society etc etc. CC and T raises many policy challenges.

Communicate, Communicate and Communicate.

e.g., Visualisation methodologies (see video).

Environmentalism and Science



Discussion #1

Climate change and tourism have bi-directional impacts on each other.

Sub-regional research is vital.

Many tourism businesses in are aware of climate change.

Lack of incentives to implement adaptation and mitigation strategies.

Need intervention from Government and raised awareness.

Most SMEs do not have capacity to adapt to climate change.

Different response between, tourists, local operators in destinations, operators in source countries

Off to the Beach!

