

DISCUSSIONS AND OUTCOMES – by the participants of Workshop

All agreed that the tourism climate index (TCI) or equivalent is a useful concept. Its value lies in the fact that it is simple, descriptive, uses standard data, includes a range of variables etc, but is arbitrarily constructed and has never been verified. A new TCI is needed, one that is better designed, and then tested and verified.

TCI or equivalent does not deal with assessment of catastrophic events. What is needed is something that does. Risk takers (resort developers) vs. risk accepters (insurance companies).

What risks are tourism companies taking? How do we assess this? A lot depends on the scale of development.

The significance and importance of qualitative (vs. quantitative) information in tourism climate research was discussed, as for example, in forecasting tourism demand.

What about tropical locations? Tourism in a tropical and equatorial environments – eg SE Asia, Indonesia, Darwin...?

Tropical coastal areas have a large amount of tourism development, but most research in temperate regions.

Long haul to the tropics is fastest growing sector for travel Europe.

We need to explore the distinction between impacts of climate on tourists vs. impact on the tourism industry (i.e. tourism development).

What do planners need? We (the scientists) need to translate the technical work of researchers (climatologists) into simple language and explain this in uncomplicated terms for use by planners, tourist operators etc. Methods used should be transparent but simply expressed **and** explained.

Planners need to know how much climate will improve or deteriorate in the future. Good TCI index would show this.

Make the classic jump from theory to practice. Eg: global warming will result in the need for an increase in the number of air-conditioned hotel rooms. What are the costs of doing this vs. doing nothing? This is an example of a simple, straightforward translation of the significance of climate change.

What about sea level? Need to convey “scientifically correct” information to planners. For example, regionally detailed and highly accurate measurements show that sea level is not rising in the tropical Pacific. Do planners believe otherwise?

There is a need to provide potential tourists with probabilistic information on climate to be expected at various destinations. Leads to improved information and improved choice. Costs: to tourists (eg heat stroke) vs. costs to tourism operators. Already tourists and tourist operators can take out insurance on likelihood of “bad” conditions occurring. This raises the point: How do insurance companies define “bad weather”? We need to look into this.

Climate derivatives (eg HDD) are currently being traded on stock exchanges (like commodity futures). Are there analogues in tourism climate work? Is the TCI for example a climate derivative?

The day's proceedings showed up a surprising diversity of expertise among those attending the Workshop – especially a diversity of approaches that are likely to be mutually beneficial.

Interlinkages both of concepts and applications were commented on – e.g. thermal indices used in architecture and design considerations and in recreational park planning and management.

Importance of non-thermal facets (aesthetic) of climate - Christine Brandenburg (land-use/park planner) drew attention to importance of clear skies (sunny conditions) in assessments of recreation climates.

Importance of only using thermal indices that have been checked and verified using field data - Marialena Nikolopoulou (architect) drew attention to the fact that PMV (i.e. predicted thermal satisfaction) had little or no relationship with actual satisfaction.

Planners require climate data that is quality-checked, easy to use [i.e. well sorted]. Point raised by Christine Brandenburg, a land-use/park planner.

Role of climate in considerations of destination choice - especially in relation to increasing use of the Internet.

UV risk as related to ozone-layer thinning is not well understood, in Argentina.

Heatwave prediction – up to six-day forecast accuracy is good. Application of this?

Andreas Matzarakis stated that climate information available for tourists to Greece is inadequate.

Catastrophic events in coastal tropical areas – data/info on this for tourism.

What may be useful to develop is a tourism climate equivalent to *The Lonely Planet* guide.

Need to keep in mind that human behavioural response considerations are important in many applications.

The Workshop group acknowledged the importance of human body-atmosphere heat balance schemes and resulting indices to tourism climate research. These indices integrate the thermally relevant atmospheric, environmental and physiological variables. But they are often applied inappropriately. There is a need to settle on a base-standard for heat balance models used in tourism-recreation research. Suggested guidelines are summarised below:

Standard/typical/mean state for general application of heat balance models.

Body and environment

Metabolic rate: 80 W m^{-2}

Assume individual is acclimatised.

Body area (DuBois) 1.8 m^2

Posture: standing (approx equiv)

Clothing albedo: 0.30

Warm-season clothing insulation (amount) = 0.5 clo

Cool-season clothing insulation (amount) = 1.0 clo

Albedo of surroundings: 0.25

Sky condition: $n/N = 1$ (i.e. cloudless)

Mean radiant temp (longwave only) = air temperature ($T_{\text{mrt,l}} = T_a$)

Application to climate conditions (i.e. with standard data)

Daily “maximum” thermal condition:

Daily maximum air temp

Solar noon

Sky condition: $n/N = 1$ (i.e. cloudless)

Wind speed: 0.5 m s^{-1}

Longwave mean radiant temp (longwave) = air temperature ($T_{\text{mrt,l}} = T_a$)

Daily “minimum” thermal condition:

Daily minimum air temp

Solar radiation = zero

Wind speed: 0.5 m s^{-1}

Longwave mean radiant temp (longwave) = air temperature ($T_{\text{mrt,l}} = T_a$)

Note: Need to generate mean values from above real-time calculations.

Standard (input) climate data:

Daily “maximum” thermal condition:

Maximum daily air temperature

Vapour pressure near middle of day

Daily “minimum” thermal condition:

Minimum daily air temperature

Vapour pressure at night or near sunrise

It is important to recognise that research methods in tourism climate have to be both transparent and consistent.

As far as possible we should adopt standard methods and indices.

Develop specialist tourism climate forecast indices, say for golf, skiing...

Overall, multipurpose regional (and city scale) scale index that guidebooks, govt advisory services etc could use.

Use same methods approach for both cold and warm tourist climate applications/conditions.

Future Research Topics

Climate therapy: Health climatology - climatic elements related to health therapy. Demand could be large – especially respiratory diseases.
Include UV-related themes.

Bioclimate information for tourists and recreationists. Say, advisory services provided by local Meteorological Services for: a) day-trippers and vacationers planning weeks ahead.

Need for and usefulness of bioclimate advisory services for tourists – especially trampers and other outdoor pursuits.

Investigate precisely the type of bioclimate information that should be available to tourism decision-makers – what are their needs?

Commission consider the international standards for definitions for key terms: outdoor recreation, recreationist, tourism, tourist. See World Tourism Organisation Webpage.

The need for developing conceptual framework(s) for tourism climate research. Start by doing an inventory of research to date, and then categorise these. Conduct a review of and search for common approaches, methods...paying close attention to covers all disciplines that deal with tourism.

What about the globalisation of tourism?

Land use planners, architects, urban planners could have data that are useful to tourism climate assessment.

Publications on tourism climate information for travel industry for promotional purposes and marketing.

Tourist planners (including tourist industry) and tourists are two very distinct groups. The former are most interested in capturing/attracting the largest possible numbers of vacationers.

There are those interested in various aspects of tourism climate: climate as an asset, climate impacts and methods of climate assessment, so interactions need to be considered.

Future of the CCTR? All agreed that it should continue. In the meantime, list Workshop delegates on Website along with the area of specialism alongside name link to other websites.

Review usefulness of new label: “Impacts of climate on tourism.”

Consider posting (this) Consider posting summary report on a) ISB Webpage; b) IJB c) Notice CLIMLIST d) other relevant journals or webpages, both disciplines and tourism industry.
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PRIORITIES IN TOURISM CLIMATE RESEARCH

- Significant (implications) of climate change in heavily used tropical areas.
- Communication with the public on tourism-climate issues.
- Communication with the travel industry on tourism-climate issues.
- Is the info the public need on tourism-climate the same as what climate scientists think they need?
- What information do tourists need for their decision-making processes (eg prospect of extreme events - hurricanes)?
- Standard approach to thermal climate assessment - how do we handle spatial vs. temporal variability of climate and how we adapt to contrasts?
- How we handle, in context of tourism climate, physical and mechanical climate facets eg fogs, high wind, rain, sea-surface temp...?
- How we handle, in context of tourism climate, aesthetic climate facets eg sunshine, cloud...?
- Establish international tourism bioclimate information-base - eg TCI equivalent for world for main tourist activities.
- Verification of thermal index schemes using physiological field-testing and associated statistical testing.
- Tourists' health vulnerability indicators in relation to climate of destination (eg heat stress, vector-borne diseases...)
- Expand qualitative approach to include more tourism categories and extend to broader effects - eg moods, emotional responses (to understand the whole climate [personal] experience).
- Better understanding of what climate-related information that tourists want.
- Assessment of trends in tourists' choice of destination and projecting into the future.
- Recreational activities that exploit extreme climate conditions – what about information for this group? How do we present data and guidelines for this group? – noting that thermal comfort is not important here.
- Identify one bioclimate index simple and reliable for use globally in tourism climate research.
- Appropriate standard index needs to be convincingly “sold” to the public, and assess suitability and appropriateness in eyes of public.
- Decide among ourselves on appropriate methods and approaches - eg which indices can be used where and how and validating these beforehand.
- Identify and characterise the various interest groups we are trying to reach. Elements and methods to be used. Tourism industry; local communities; decision-makers and policy makers; scientist; and tourists.
- During holidays, weather forecasts have big influence decisions of recreations. Research is required in this area.
- Forecasts should be based on data from the region to which the forecast applied, as opposed to data from other nearby regions.
- Include biometeorological information and guidelines in standard weather forecasts – eg Canada uses wind chill and Humidex.
- Point was raised that national meteorological services should have a biometeorology branch. This would do much to assist future research in tourism climatology.
- New “TCI” is needed that is rationally based, verified and tested with real data.
- Our research need to deal separately with the meso and micro scale; results of our research need to be translated and presented in easily understood; consider in our research all of the facets of climate: thermal, physical and aesthetic.

- Need for a comparative study that investigates national-cultural differences in tourism climate preferences etc for a number of countries worldwide.
- Use website to provide tourism climate guide for travellers.