



# On the perceptions and conceptions of tourists with regard to global environmental changes and their consequences for coastal and marine environments: A case study of the northern São Paulo State coast, Brazil



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## ABSTRACT

A study on the public's perceptions and conceptions of global environmental changes (GECs) is relevant to guide future educational strategies and management actions. The present study aimed to: (1) evaluate coastal tourists' conceptions and perceptions of GECs; (2) correlate the conceptions presented by tourists about GECs and their self-declared knowledge; (3) evaluate how these tourists perceive their personal contribution to GECs; and (4) verify the frequency at which the media exposed the tourists to information about the influence of GECs on coastal and marine environments. A structured questionnaire was applied to 183 coastal tourists. There was a weak but significant positive correlation ( $r^2=0.152$ ,  $p < 0.001$ ) between self-declared knowledge and the actual conceptions of tourists about GECs and about the sea. Tourists underestimate their role in GECs, pointing out fewer individual actions that contributed to GECs in the questionnaire than expected. Many tourists declared they had never heard of some subjects related to GECs and coastal environments. This study revealed that coastal tourists are still not well informed about their role in GECs and also on their consequences to the society, thus emphasizing the need of more intensive and effective coastal and marine environmental education strategies.

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## 1. Introduction

The uses of and conflicts in coastal zones may be altered by global environmental changes (GECs) [1,2], and stakeholders maintain different perceptions and representations of this territory and theme. An evaluation of the potential effects of GECs on the goods and services provided by coastal ecosystems as perceived by users is relevant to guide future educational strategies and management actions.

It is very important to evaluate tourists' perceptions of the impacts of climate change on coastal and marine environments in

order to support decision making in touristic coastal areas. Their perceptions are also relevant because as trendsetter stakeholders that have higher incomes and education in general, tourists may have a higher likelihood of being better informed about the causes and consequences of GECs. They may also act toward the mobilization of the population to promote individual and societal behavioral changes. In addition, their activities on the coast (tourism, contemplation, etc.) are strongly correlated with the quality of the environment, which can be reduced due to GECs, such as beach erosion (causing patrimonial losses and landscape degradation), an increase in the frequency and magnitude of extreme events (also causing patrimonial losses as well as human deaths), and other indirect effects related to ecosystem services.

GECs constitute a relatively recent emerging theme that was first assembled in the Intergovernmental Panel on Climate Change (IPCC)'s first assessment report [3]. This theme is included in formal and non-formal education, and it appears on the agenda of

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the media (news, documentaries, etc.). GECs have been the focus of discussions on the scientific evidence supporting the changes themselves as well as discussions in relation to the anthropogenic causes of such changes.

In this context, the perceptions of the future impacts of climate change are likely to play a central role in the decision-making process of tourists and tourism investors [4]. Information on tourists' perceptions of the environmental impacts of GECs on destinations (i.e., perceptions of coral bleaching, diminished or lost glaciers, degraded coastlines, erosion, extreme events, reduced biodiversity or wildlife prevalence) remain an important knowledge gap that needs to be addressed if potential long-range shifts in tourist demand are to be more accurately projected [5]. For example, some impacts of climate change are likely to endure in the minds of consumers and may widely alter the perceived attractiveness of a destination over time. Therefore, it is important that the public relations and marketing campaigns of the tourism industry and governments are directed to avoid or correct consumer misconceptions about the impacts of climate change [4].

Transforming a society into one with a lower carbon footprint is a great challenge because there is a clear detachment between the comprehension of climate change phenomena and their relationship to people's day-to-day actions [6]. Constantly, news and information on these concepts are advertised in the media, in schools and through other communication systems. Between 2005 and 2007, the 50 main printed newspapers in Brazil covered the issue of GECs mainly from an environmental perspective (35.8%), followed by an economic perspective (19.7%), with a primary focus on the impacts of GECs instead of promoting a more balanced view of the impacts with their causes and possible solutions [7]. Leandrini and Motokane [8] showed that elementary school students used little scientific knowledge to inform their arguments about global warming and that many of them confused various environmental problems. Tavares et al. [9] found that the knowledge gained by high school students in four Brazilian cities regarding global warming came from the media rather than from school. A Brazilian public opinion survey on global warming conducted in 2010 with 2600 people [10], showed that (a) 90% of the interviewed had already heard about global warming; (b) women were less informed than men about the subject; (c) young people (between 16 and 24 years old) were better informed than those older than 60 years old, with 24% of the latter group reporting never having heard of global warming; (d) the more education received by a respondent, the more knowledge he or she had on the subject and the greater the rate of belief in global warming (96% for those with higher education); and (e) 75% believed that anthropogenic activities contributed to global warming.

Climate change education is still a peripheral theme in Brazilian education, both in academic research and in day-to-day school practices [11]. Our understanding of the public perceptions and representations of GECs is still fragmented and based on isolated and small-scale studies. In Spain, for example, a national study was conducted [12] and revealed that the majority of the population shared very shallow and little functional representations of GECs because their thoughts were poorly developed. Their understanding was hindered by socio-political and scientific gaps and did not establish a clear link between the problem "identified" and the assumption of personal and collective responsibilities as a basic premise to adopt significant changes in individual attitudes.

Taking into account the information above, the objectives of the present study were the following:

1) To evaluate the conceptions and perceptions of coastal tourists about climate change;

- 2) To correlate the self-declared knowledge about GECs and the conceptions presented by tourists in the present study;
- 3) To evaluate how these tourists perceived their personal contribution to global climate change; and
- 4) To verify the frequency to which the tourists declared they were exposed by the media to information about the influence of global climate change on coastal and marine environments.

## 2. Conceptual background

### 2.1. Environmental Perception

Environmental perception (EP) has been adopted as a diagnostic tool in social and environmental contexts [13–18], mainly after the constitution of UNESCO's Man and the Biosphere (MAB) program in 1968. This program emphasized the study of environmental perception as a fundamental tool for the management of places and landscapes of importance to mankind. Whyte [19], in a publication for MAB, summarized the field methods for research on environmental perception and evidenced its advantage as a tool for diagnosing socio-environmental problems and proposing solutions to these problems.

Martinez [20] reported that the social perceptions and representations of the environment were a source of conflict related to the direct or indirect use of natural goods and services but also noted their use as a possible tool for the resolution of such conflict. Environmental perception comprises the theory that the assimilation of an image or concept can only be achieved after the perception of the whole [15], i.e., a holistic perspective composed of different environmental signals available to each individual [21]. As Martinez [20] noted, these concepts may be applied to an environmental theme when predicting or influencing preventive or palliative behaviors, which may reduce the pressure on nature. The study of Tuan [22] on topophilia (or a strong sense of identity with a place) and other studies on humanistic and cultural geography [21,23,24], emphasized the complexity of this perception, which is influenced by the physical nature of the environment as well as cultural, social, and cognitive aspects [25]. In other words, both individual and social dimensions lead to choices of behaviors or political decisions [19]. Thus, perception is an important factor of the cognitive process of human behavior, which involves affective, social-cultural and organic aspects [23,26,27].

Perception is inherently active and exploratory from a biological and mental organism. When there is an active search for meaning, it is easier to perceive something. The perceiver influences the environment and is influenced by it. They cannot be separated because the perceiver is, at the same time, part of the system that he or she perceives. The cultural aspect influences the human being, so it is correct to affirm that it influences perception and, consequently, the action and method of solving problems.

As a phenomenological approach see [28], the study of perceptions considers the subjectivity of each individual in his or her interpretation of the environment and definition of behaviors, thus expressing the complexity of the relationships between man and nature. The perception process is more than a simple registration of sensations, and the information needs to be processed and organized to make sense. There is a relationship between perceptual knowledge and representation. Representation points to the subjectivism of something meaningful that connects previous knowledge and the expectation of the future. When there is a conflict between previous experiences and expectations or when experiences are violated by the environment, the perceiver's behavior can be described as resistance. In this way, the theory of social representation [29,30] may also integrate the theoretical

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