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Disjunct perceptions? Climate change threats in two-low lying South African coastal towns

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Abstract. Coastal towns rely heavily on the quality and expanse of their beaches to attract tourists. Climate is an important tourism determinant, controlling the length and timing of peak arrivals. South African tourism is particularly reliant on these factors. Perceptions of tourists and tourist accommodation establishment regarding climate change threats to tourism are explored for the towns of St Francis Bay and Cape St Francis. Tourism accommodation establishments were predominantly concerned with day-to-day changes in weather, investing in small-scale infrastructural changes to improve the comfort of their guests. By contrast, tourists demonstrated greater concern for the risk of flooding, sea-level rise and the degeneration of the beaches. This reflects concerning disjunctures between perceptions of tourists and accommodation establishments regarding climate change threats. This may portray to tourists insufficient investment in adaptation at accommodation establishments, resulting in decreased tourist visitations in the short-term in favour of destinations perceived as better prepared.

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1. Introduction

The South African economy relies heavily on its growing tourism sector (Rogerson, 2007; Rogerson, Kiambo, 2007; Visser, Hoogendoorn, 2011). The country has a variety of tourism attractions, many of which rely on the good climate characterised by clear skies, warm weather and mild winds year round (Rogerson, 2012). The sector is significantly comprised by beach- and nature-based tourism, both of which rely heavily on continued mild climate conditions, a pristine natural environment, and the maintenance of exsting biotic and abiotic attractions to sustain tourist arrivals (Preston-Whyte, Watson, 2005). South Africa has a large number of small towns which are economically dependent on tourism, and whilst they provide a range of tourist attractions, these predominantly are centred around outdoor activities including game drives, hiking, water-sports, fishing and leisure time at local beaches (Hoogendoorn, Nel, 2012; Hoogendoorn, 2014; Hoogendoorn, Visser, 2016).

Climate change is projected to result in rising sea levels; temperature increases; changes in the timing, amount, and severity of precipitation; changes in wind direction and strength; and rising sea levels (Theron, Rossouw, 2008; Davis, 2010). These factors threaten the economic, infrastructural and competitive viability of tourism in southern Africa, particularly in contexts where tourist attractions rely on the current climatic conditions (Rogerson, 2014). Climate change consequently has the potential to economically cripple the tourist establishments, tourism sector, small tourist-towns, and the South African economy at large, if sufficient awareness is not ensured and action is not taken to adapt to these threats.

The adjacent coastal towns of St Francis Bay and Cape St Francis in the Eastern Cape Province of South Africa provide an example of tourism-reliant locations which are under multiple scientifically confirmed threats relating to climate change (Fitchett et al., 2016). Located on a gently sloped coastal plain, the towns are under considerable threat from sea-level rise.Digital Elevation Model sea level rise projections confirm that this will initially encroach on the beach, destroying tourist features, and eventually inundate much of the developed area, flooding the tourism establishments, and destroying roads and bridges which facilitate access into these towns (Illenberger, 2010; James, Hermes, 2011; Fitchett et al., 2016). Changes in temperature, rainfall, and wind are also of concern to the town, which provides predominantly outdoor attractions to tourists, and which has distinct tourist peak seasons which are based on the timing of warm temperatures and clear skies (Theron, Rossouw, 2008). Analysis using the Tourism Climate Index (Mieczkowski, 1985) confirms the climate influence on the peak season, and indicates a gradual decline in the tourism climate suitability of the towns over the past 30 years (Fitchett et al., 2016). Additional concerns in these towns include the Kromrivier Estuary and Canal, which pose a higher flood risk, and the position of nearby sand-dunes, which could result in dust storms under increased wind conditions (Theron, Rossouw, 2008; James, Hermes, 2011).

It can be argued that due to the highly mobile nature of tourists, poor weatheror unsuitable beaches can occur for only a few weeks during a tourist season and result inlong-term damage to the tourism viability of the region (cf. Saarinen, Tervo, 2006). With easily accesible information on climatic conditions and beach quality on a range of possible tourist locations on offer both locally and internationally, it is both easy, and inevitable, that tourists will select a destination which is best able to provide ideal vacation conditions (Saarinen et al., 2012). It is not sufficient to implement adaptation measures only once there is evidence of damage arising from a particular climate change threat, as it would be difficult to re-establish tourist trust. Rather, an awareness of climate threats, and robust, proactive adaptation is essential. Such planning and adaptation to climate change threats, however, has not yet been forthcoming in the region. It is there-

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fore important to understand the perceptions of climate change threats held by both the tourist accommodation establishment proprietors who would implement adaptation strategies, and by the tourists who would potentially chose to vacation elsewhere, to determine the likely sustainability of the tourism sector. This paper explores these perceptions, with a focus on understanding inconsistencies between those held by each of the groups. This is of value in determining the likely impacts of climate change on the tourism sector in those towns, as well as broader patterns of apathy and action in climate change adaptation in the tourism sector regionally.

2. Conceptual dilemas in climate change and tourism

The tourism sector is increasingly aware of climate change, and is likely to incorporate climate change into itsplanning, yet the views of tourism stakeholders, including tourists, is often lacking (Moreno, 2010). Of greater concern, Scott et al. (2009) argue that an alarming number of tourism businesses currently ignore climate change as a real threat. Negative impacts of climate change on tourism include declines in the climate suitability of destinations, resulting in a decrease in the number of tourists, with far-reaching economic impacts (Hall, 2006; Kyriakidis, Felton, 2008). Indirect effects include climate change impacts on the natural environment, including decreases in biodiversity, and changing environmental seasonality, which in turn will decrease the environmental attraction of the location (Fitchett et al., 2015). It is projected that by 2050, the tourism sector will experience significant climate change impacts, with considerable fluctuations in tourist numbers in locations of variable climates as tourists search for better suited locations(Berritella et al.,2004).Due to the severity of projected climate change and its impacts, climate change is being integrated into sustainable tourism development initiatives and research (Williams, Ponsford, 2009; Hall et al., 2015). To attain long-term sustainable development, the tourism sector has to deal with a range of projected climate change impacts (Turton et al., 2009). The lack of intersection of climate change and tourism research in southern Africa is of concern, as it limits future adaption and mitigation potential (Simpson et al., 2008; Hoogendoorn, Fitchett, 2016).

The economic impacts of climate change are likely to be skewed against developing countries, due to their lower adaptive capacity (Mendelsohn et al., 2006; Amelung et al., 2007; Beck, 2010). Furthermore, climate change will hinder developmental efforts in these countries through infrastructural damage, and increasing the strain on natural resources (Nicholls et al., 2007).South Africa, which is a highly ranked travel destination, is projected to experience an above-average rate and intensity of climate change (Davis, 2010; Rogerson, Sims, 2012). Further threats are presented by sea-level rise, as the country is bounded by oceans, providing numerous beaches as important tourist attractions (Davis, 2010; Rogerson, Sims, 2012).Despite these threats, little in-depth research exists on adaptation towarming temperatures, sea-level rise or the increased frequency and intensity of storms along the South African coast (James, Hermes, 2011). Coastal squeezeis already occurring and is projected to worsen in South Africa, resulting in an inundation of backshore sections of beaches, and a compression of the upper intertidal zone (James, Hermes, 2011; Theron, 2011). Rising sea levels also result in saline intrusion into the groundwater system (Theron, 2011). Changes in storm activity remain contentious and regionally specific: whilst storm activity may become more frequent and severe on the southern coast of South Africa, tropical cyclone positions are shifting southwards along the east coast, but with no change in storm energy (Boko et al., 2007; Fitchett, Grab, 2014). Changes in storm patterns are of concern, as in coastal regions they can induce further flooding through storm surges (Tandross et al., 2011). Changes in mean annual precipitation demonstrate more extreme regional variation: the western half of South Africa, which is already classified as arid,is projected to experience reduced rainfall, whilst the humid eastern half is projected to experience increased rainfall, particularly along the coast (James, Hermes, 2011). In the instances of extreme storms, for which inadequate future mitigation has been made, existing coastal defences may be breached, resulting in damage to the infrastructure of the coastal region (Tandross et al., 2011). Sea-level rise, meteorological changes in the amount of precipitation, and the frequency of severe storm

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events interact to present significant, multi-faceted threats to coastal infrastructure, and the economic sectors reliant on it.

3. Material and research methods

Semi-structured interviews were conducted in both St Francis Bay and Cape St Francis (Fig. 1). The sample is takenfrom two unique groups: the proprietors of tourist accommodation establishments, and tourists themselves. Tourists were approached on beaches, and in restaurants, shops, and accommodation establishments located within the two towns; from which 52 responses were obtained using non-probability sampling. There were a total of 57 tourism accommodation establishments in St Francis Bay and 31 in Cape St Francisrespectively during the time of fieldwork. From this, a total of 36 responses from St Francis Bay and17 from Cape St Francis were obtained, yielding response rates of 63% and 54% respectively. Interviews were carried out in person with accommodation establishment-proprietors during the off-season periodof September 2014, and with tourists during the in-season

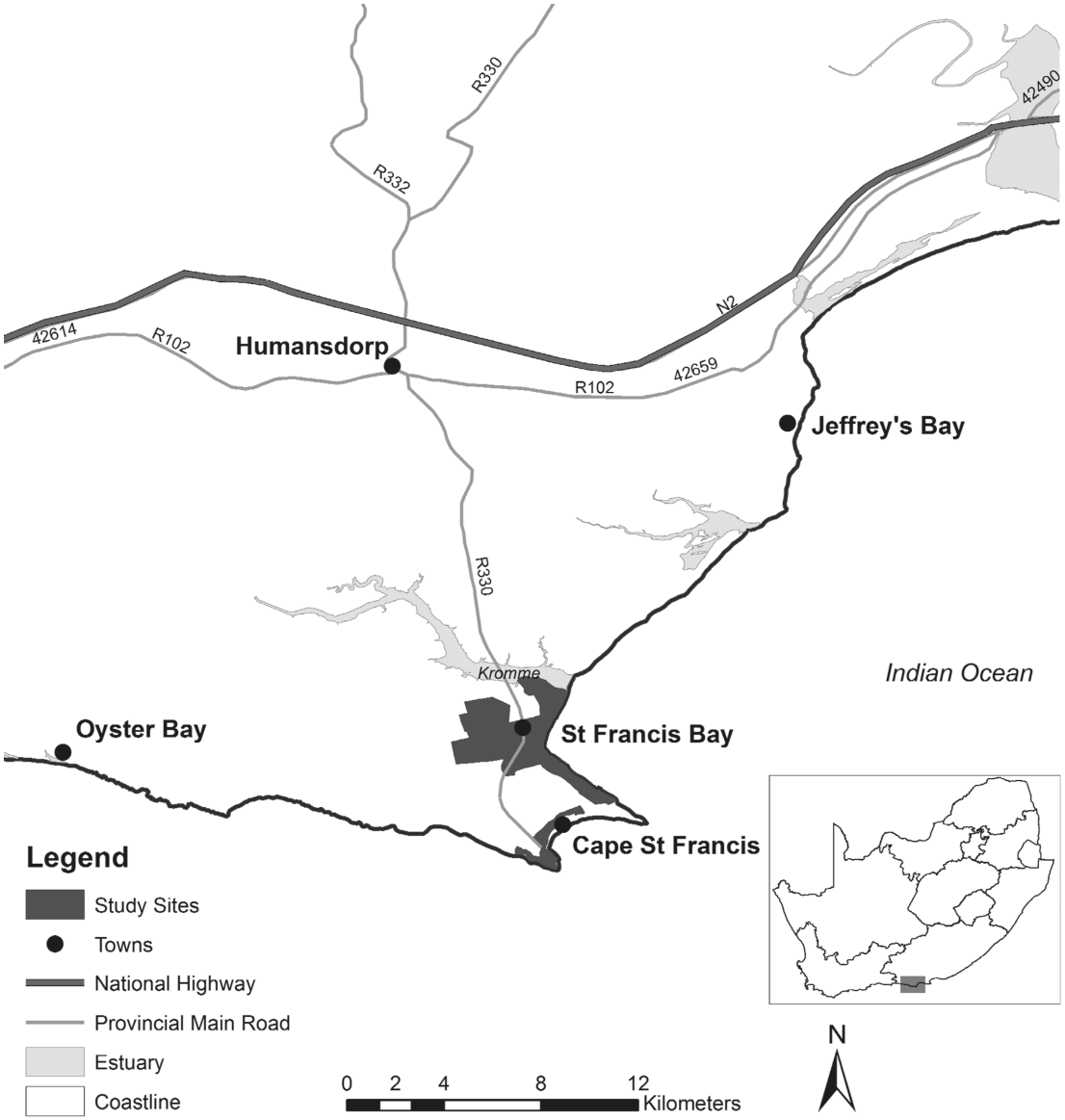

Fig. 1. The location of the study sites – St Francis Bay and Cape St Francis, Eastern Cape.
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period of December 2014. As this research is perception-based, perception is defined as the process of interpreting sensory information received through environmental stimuli and actions taken in responding to stimuli (Gössling et al., 2006). The study addressesperceptions linked to climate change, including respondents' awareness and the potential for adaptation strategies that can be implemented (see Hoogendoorn, Fitchett, 2016 for a deeper reflection on methods followed).

The population of St Francis Bay and Cape St Francis have been estimated at 4933 and 342 people respectively by the 2011 census (Frith, 2014). The main tourist attractions include the beaches, and a series of canals and waterways, which are ideal for watersports.Many second homes situated in the townsare rented out to tourists, with the majority of these located along this canal system, an area of St Francis Bay which is commonly known as 'Little Venice' (Mortimer, 2014). Fig. 2 indicates the location of tourist accommodation establishments in St Francis Bay during 2014. In Cape St Francis, the tourist accommodation establishments aremost commonly self-catering (Fig.3). A nature reserve connects the towns, providing apopular eco-destination (Elsden, Rossoux, 2009).

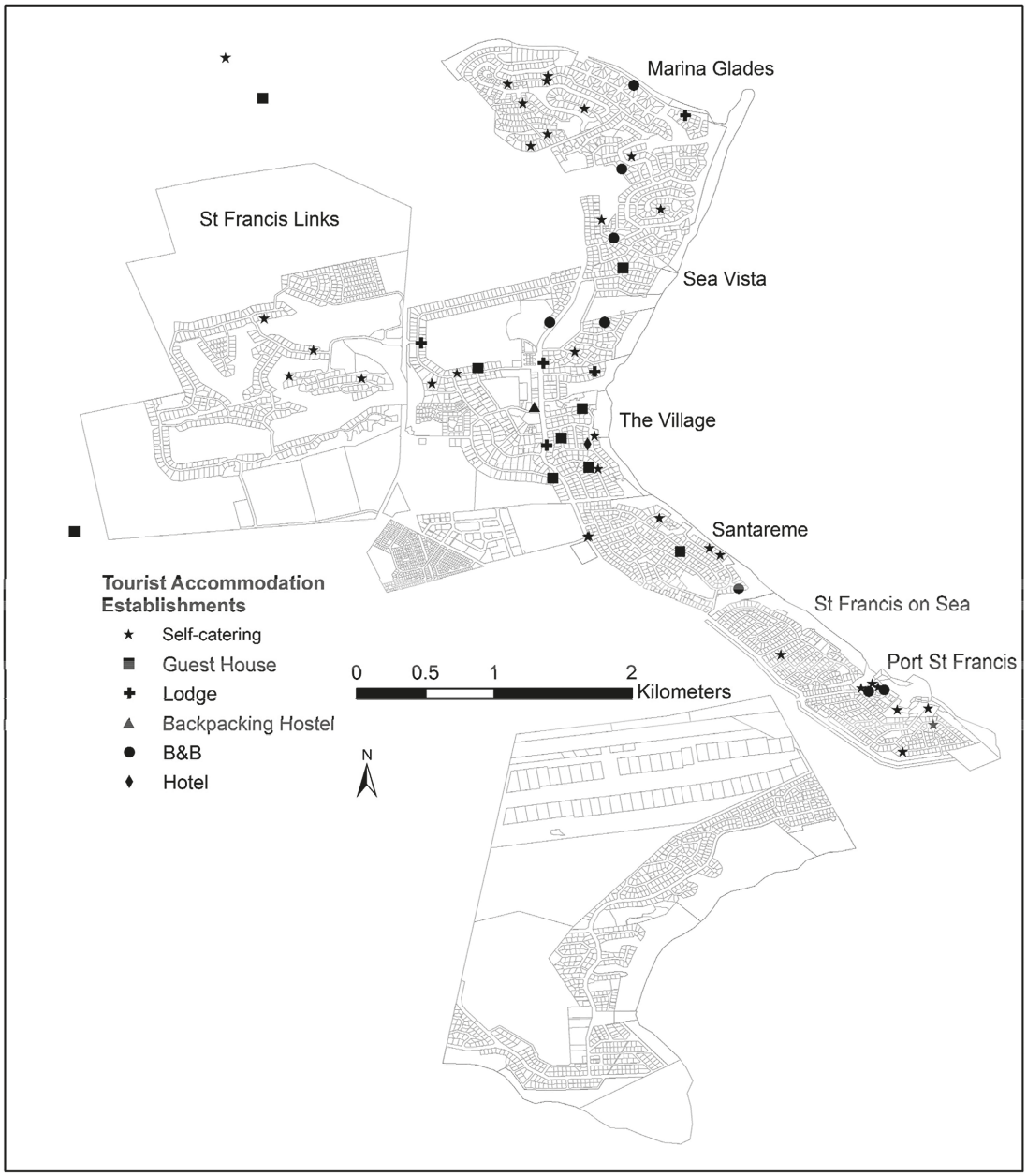

Fig. 2. Location of tourist accommodation establishments in St Francis Bay

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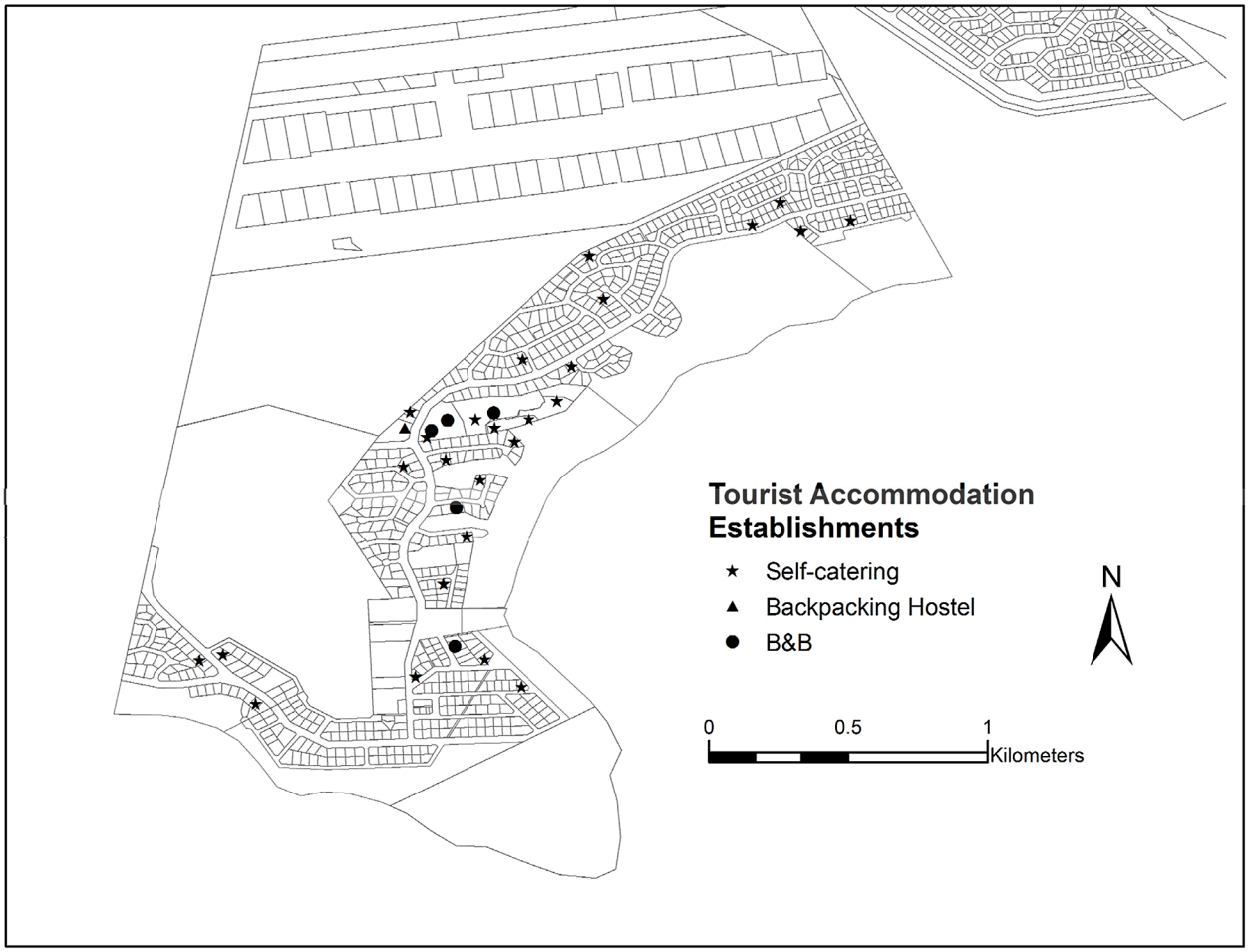

Fig. 3. Location of tourist accommodation establishments in Cape St Francis.

Source: Authors

4. Results

4.1. Tourist perceptions of climate change in St Francis Bay and Cape St Francis

The tourists interviewed included 25 South Africans who had travelled from Johannesburg, Durban, East London, Pretoria, and Kimberley, and 27 international tourists visiting from India, China, Germany, the United Kingdom, New Zealand, the United States of America, and Canada. Nearly all respondents agreed that the world's climate is changing, with only three answers demonstrating uncertainty in this regard. Forty-six respondents believe that the effects of climate change are currently being felt, and predominantly manifested in variable temperatures, as comments such as "winter is not as cold anymore" and "maximum temperatures are getting higher and higher" were common. Of the tourists who were unsure as to whether the world's climate is changing, two respondents felt that if it did change, it would take at least 100 years before any effects were experienced. Comparing the relative vulnerability of different commercial sectors to climate change, tourism was listed as a sector that had the capacity to sufficiently cope with a changing climate, provided that infrastructural adaptations were implemented to mitigate the effects of climate change, and through altering tourist attractions in relation to the climate, and offering new attractions. Tourists believed that the greatest threat to coastal communities would be sea-level rise, but that this problem is manageable through coastal barriers.

Tourists perceptions of the severity of climate change risks, and their travel decisions associated with these risks are notable in determining the sustained viability of tourism in the region. Flooding

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was ranked as the weather condition that would have the greatest impact on travel decisions because of the risks it presented. Poor visibility was rated by 35 tourists as the second-most influencial weather condition for their travel decisions. The greatest appeal of a destination, according to the respondents, is good views and enjoyable scenery. Humidity, whilst lowering thermal comfort, was not considered a factor that would make a destination unappealing, as one could stay in the shade or swim. Wave conditions were not influential either, with respondents arguing that poor weather conditions would allow them to explore other tourist attractions in the region, and that wave conditions would not be unpleasant for the entire duration of the holiday. Tourists would however cancel their accommodation in the event of flooding, poor visibility, regular storms, and high winds.

The perceptions of the impact of climate change on tourism in St Francis Bay and Cape St Francis were extensive and variable. Respondents were concerned about the frequency and severity of storms in the area increasing, resulting in big waves and flooding occurring more often. Many of the tourists expect major damages to the towns due to flooding, in light of the effects of previous flooding incidents in the area. Sea-level rise was stated by nearly all the respondents as being particularly dangerous, potentially flooding the roads and beachfront properties and damaging infrastructure. Further concerns regarding sea-level rise included increased salinity contaminating freshwater from seawater intrusion, resulting in water problems for the towns. Another sea-level rise concern for many tourists was the erosion of the beaches, which would decrease tourist numbers. Other threats from climate change to tourism included damage to the ecosystem, and the marine life being threatened. All of these effects were considered consequences of climate change that will result in less tourist visitation.

Many respondents felt that whilst climate was important to the attractiveness of a destination, overall personal comfort is more important, and that a holiday should be an improvement on day-to-day living. Interestingly in this context, 26 respondents claimed to be willing to pay higher accommodation rates in order to assist proprietors with adaptation costs. Thirteen respondents said that they would not ideally pay additional costs and would likely seek alternate accommodation elsewhere at lower rates. This response was justified by the local tourists by their belief that climate change adaptation costs should be the responsibility of the government, and that these measures should be implemented by the government in order to maintain the appeal of the destination to tourists. The remaining 13 respondents were indifferent to paying higher rates, stating that they were not against it, but may feel differently if it increased the overall cost of the holiday dramatically. Notably, 31 respondents would also prefer to stay at accommodation establishments whose proprietors took an active part in mitigating and adapting to climate change. This was based upon the appeal of a positive impact being made to improve their establishments and caring for the environment.

4.2. Climate change perceptions of tourism accommodation establishment proprietors

The tourism accommodation proprietors who were interviewed included self catering establishments, lodges, bed and breakfasts, backpacking hostels, guest houses and hotels. The results do not demonstrate particular themes according to establishment type, and thus the results are pooled henceforth. Thirty-five interviewees from tourism accommodation establishments believed that climate change was a cause for concern, whilstthree of the respondents were indifferent. Forty-tworespondents were of the opinion that they were already experiencing the effects of climate change,and the remaining12 respondentsfelt that the effects would only be experienced in 100 years or more.Respondents from establishments located closest to the ocean predominantly demonstrated a greater concern for climate change than those with properties situated further inland.A fewrespondents operating establishments near the ocean had relatively lowlevels of concern (Fig. 4), but this group all operated from properties situated in areas such as Port St Francis, an area protected by sea defence barriers, providing a heightened sense of safety.Proprietors of establishments situated along the Kromrivierestuary and in the Marina Glades canal system had a medium to high level of concern regarding the threats of climate change due to previous flooding events.

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In Cape St Francis, there were two establishments near the coast whose proprietors demonstrateda low level of concern. However, these are situated at a higher altitude than the rest of the town, with large boulders along the beach which could provide defence against flooding. Thirteen respondents did not believe that climate change would negatively affect their establishments at all.

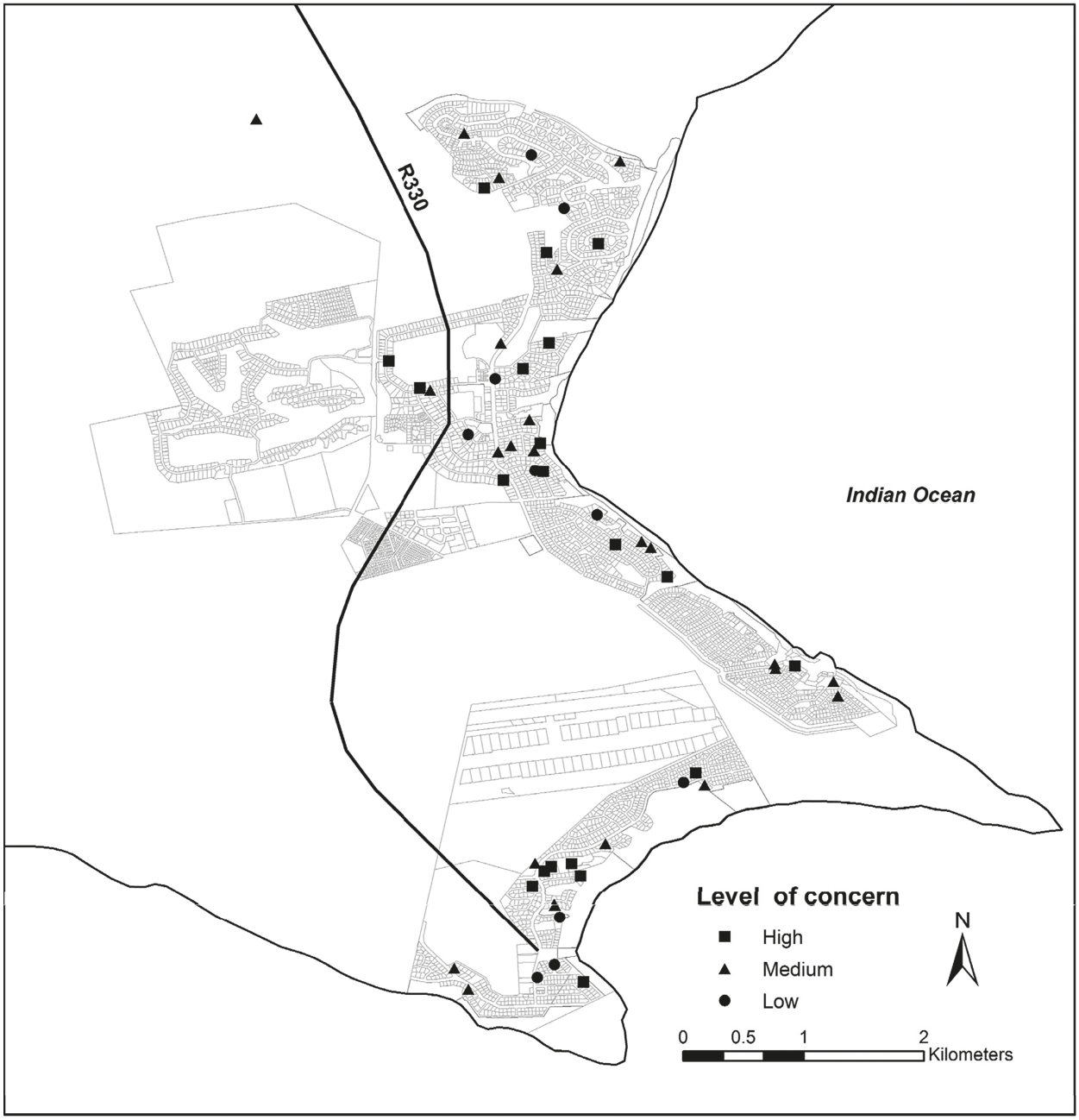

Fig. 4. The level of concern that the accommodation establishment proprietors have for climate change.

Source: Authors

Thirty-fiverespondents felt that climate change would have a negative effect on the towns. Many of these respondents had been affected by, or been within close proximity to the fires which destroyed numeroushouses on the canals in 2012, and/or the floods which occurred near the St Francis Links Golf Course in 2011. Owners of properties located closer to the coast in Cape St Francis largely agreed

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that the town is vulnerable to the negative impacts of climate change.Fourteen respondents had experienced damage to their infrastructure as a result of extreme weather events over the last five years. These events resulted in a bridge in St Francis Bay being washed away four times within a two-year period, compromising access to some of the tourism establishments. The establishments that had experienced flooding were located along the Marina Glades canal system and along the coast near the Santareme area of St Francis Bay. Cape St Francis respondents also experienced flooding along the main road, which washed away the Sand River Bridge, hindering access to the town. Some of the establishments had also directly experienced problems from heavy rainfall, withleakingcausing damage to accommodation rooms.

Overall, respondents argued that the greatest impact of climate change would be the decrease in the number of guests and changes in reservation patterns. A number of proprietors were concerned about hotter, more humid weather, and installed air-conditioning systems to make their establishments more comfortable for tourists under such conditions. Concern was raised by respondents that climate change would lessen the ability of the towns to offer tourism activities, including fishing and hiking, reducing their competitive advantage against other coastal towns. Forty-four respondents felt that climate change result in damages to their establishments in the future: the majority of respondents mentionedflooding, with the threat of bridges being frequently washed away. This brought up concern for a loss of revenue. Sea-level rise was stated to be the largest threat for beachfront properties, with owners fearing flood damage or the infrastructure collapsing entirely if foundations becomedamaged. Beach erosion was mentioned, with respondents worried about coastal retreat. At a town-scale, infrastructural concerns were centered on damage to roads.

All respondents felt that eight parties are responsible for mitigation of, and adaptation to climate change, namely: environmental groups, individuals and their families, industry/companies, local authorities, the tourism sector, state/provincial governments, national governments, and the international community. The respondents deemed government to be chiefly responbiblefor climate change adaptation plans, including the provision of information about climate change adaptation, and covering the costs involved in all adaptation measures required to protect the town. At the level of the broader tourism sector in the region, the promotion of tourism during winter months, or when weather conditions are less than ideal, isbeing considered. At the level of individual accommodation establishments, this has been suggested to be implemented through increasing the number of indoor activities available at the establishments, providing digital satellite television, DVD players and Wi-Fi and creating lounge areas with a selection of books and board games.

None of the establishments' propietors mentioned plans to relocate their businessesasa response to sea-level rise. Rather, they strongly believed that sea-level rise would be addressed at a town-scale, including the use of sea defences such as 'dolosse' (interlockingconcrete blocks of complex geometric design) in the port of St Francis Bay, relying exclusively on the government for infrastructural adaptation.Respondents suggested that the effects of climate change are too distant, and that the owners of the accommodation establishments would no longer be alive by the time effects did occur. Others felt that implementing changes would only become necessary once these climate change impacts directly affected their businesses. This is surprising given the regular flooding which the respondents mentioned, with considerable damage to invididual establishments. This may be influened by the great costs of infrastructural change, or a belief that insurance will pay for damages.

5. Conclusions

Whilst both groups interviewed are aware that the impacts of climate change may be damaging to the towns and the individual accommodation establishments, their understanding of the severity of the issues and the need for individual adaptation plans vary considerably between the tourists and accommodation establishment proprietors interviewed. Notably, it would appear that from the tourism perspective, the tourists are predominantly concerned by sea-level rise, whilst the accommodation establishment proprietors are more worried about the

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changes to environmental comfort of their patrons, which would occur due to temperature and rainfall changes. This is interesting, as conversely it will be the tourists who would be directly affected by changing meteorological variables, and the accommodation establishments which would incur direct and immediate damage through flooding. The tourists interviewed are largely willing to incur a few days of bad weather, and explore other attractions in the area, but would make plans to visit alternate destinations should flooding become a threat. Tourism accommodation establishments are making infrastructural adaptations to improve their response to poor weather, but are not making any efforts to address the threats of sea-level rise. Notably, the tourists appear aware of this lack of adaptation from the accommodation establishments, and even voice a willingness to incur greater accommodation costs to support adaptation to climate change threats.

The level of understanding of climate change was high, and both tourists and tourist accommodation providers are interested in participating in adaptation against climate change, but are not yet taking an active role (similar to findings of Semenza et al., 2008; Spence et al., 2011). The proprietors of the accomodation establishments identify that problems such as sea-level rise and flooding may be a threat, but are unwilling invest in adaptation strategies at this point to protect against losses. The reasons are twofold. First, the accommodation establishments strongly believe that this is the responsibility of the local government, and that they should not have to invest in adaptation strategies for threats that the government should protect them from. Notably, the local tourists appear to share this sentiment. Second, the accommodation establishment proprietors believe that sea-level rise will only become an issue in ~100 years, by which point they will no longer be there. Consequently the tourism accommodation establishments argue that they are more concerned with adapting to and surviving present circumstances.

The tourism accommodation establishment proprietors appear, at some level, to be making cost-benefit assessments regarding the implementation of adaptation measures whereby they weigh up the cost of each form of mitigation against the probability of a climate threat occurring, whilst considering additional benefits or detriments of such adaptation actions should the climate threat not be realised. They demonstrate their willingness to adapt to the threat of changing meteorological conditions through installing air-conditioning to improve comfort in their establishments during hot days, and satellite television and Wi-Fi to provide alternative activities on the more frequently occurring rainy days. These climate events are currently more conceivable than sea-level rise, due to the observedoccurrence of heat waves, cold fronts, and rainy days. These are also adaptation measures which improve the amenities of the establishments under current climatic conditions, affording visitors greater relaxation and business facilities. Finally, they are relatively low-cost adaptations. Therefore, the establishment proprietor has a high likelihood of recuperating the costs of the adaptation measures over a short period; with no potential harm should climate change not occur as soon as has been projected. Accommodation proprietors are not yet investing in infrastructural changes to address the threats of flooding from sea-level rise, such as building retaining walls. In the case of sea-level rise, whilst flooding events have occurred in the recent past, they are discrete events –often assumed to be 'freak accidents' rather than part of progressive change. There is no certainty that a flood event could occur the next year, or even in the next 10 years, and so the cost-outlay could be met with no direct protection. The decision to make an infrastructural change such as the development of retaining walls is considerably more expensive than installing satellite television, with potentially no benefit to the establishment over the remaining years for the current proprietor. Furthermore, unlike satellite television and Wi-Fi, which contribute positively to the establishment (even if climate change does not result in the projected damages), such infrastructural changes may negatively impact on the amenities of the establishment through blocking sea views. Finally, and if the government were to make the infrastructural adaptations to protect the town from sea level rise, which the tourism accommodation establishments believe they are responsible for doing,the individual retaining walls builtat each accommodation establishment would then be unneccesary, and constitute waste of money.

In closing, we would argue that the disjuncture in the perceptions of tourists and tourism accom-

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modation establishmentregarding climate change threats poses risks to the tourism viability of the region. The continued attraction of tourists to a particular destination requires that the real and perceived safety and quality of holiday for the tourists is prioritised. With low-cost, easy access to information on a range of tourist destinations at any point in time, tourists will select a destination which they believe will guarantee the best vacation experience, within their particular budget. The concern of tourists regarding the threat of sea level rise in St Francis Bay and Cape St Francis, and their observations of a lack of adaption in place to mitigate these threats, may act as a significant detterent to tourists who would rather visit a more proactively adapting region which they perceive to be safer. This is heightened given the extensive damage of flooding events in the region over recent decades, and the highly unpredictable nature of flood events, requiring urgent adaptation to protect the region from the worst case scenario. The vehement belief of tourists that adaptation needs to be a priority is highlighted through their willingness to contribute to adaptation costs through increased accommodation rates.

Whilst it may be justified for the tourism accommodation establishments to expect government to make large-scale infrastructural adaptations to protect the town, it does not address the concerns of tourists in the short-term. Tourism accommodation establishments are making smaller-scale adaptations to improve the comfort of visitors during days with poor weather conditions. This too appears in disjunction with the expectations and demands of the tourists, who claim they would not mind a few days of bad weather as they could then explore other tourist attractions in the region.

Scientific risk analysis for the region confirms the beliefs of the tourists – sea level rise poses considerable risks to the tourism accommodation establishments in the region over the next 50 years, and the climate suitability of the region, whilst declining slowly, remains categorised as 'very good' for tourism (Fitchett et al., 2016). However, the detriments to the perceptions of tourists that the lack of adaptation presents, may reduce tourist numbers to the point where the viability of the tourism sector in the region is compromised, before such risks are tangibly realised. Proactive adaptation by accommodation establishments is therefore highly necessary, both to prevent damages from sea-level rise and associated flooding, and to maintain tourist trust and loyalty to ensure continued visitation to the region.

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