



Aotea/Great Barrier International Dark Sky Sanctuary

Report to International Dark Sky Association

October 2017

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REPORT TO THE IDA

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1. INTRODUCTION

Aotea Great Barrier's recognition as an International Dark Sky Sanctuary was approved in May and formally inaugurated for the island community on 19 August, 2017. In the intervening period several local committees and interest groups began work in earnest to welcome the Sanctuary in true Barrier style, with true Barrier enthusiasm. A guest list of local and national dignitaries was prepared. Liaison was formally established with the Aoraki-Tekapo Dark Sky Reserve Trust. The local airport terminal was reconceived and installation art mounted permanently showing imagery of the Barrier's night skies on large window-ceiling panels. The local tourist industry interest group, Destination Great Barrier Island met several times to coordinate local service providers. A presentation book celebrating the occasion, outlining the history of the island and the path it had taken to Sanctuary status was written and published in time for the August inauguration. The local GBIAstronomy Group coordinated a course delivered by the President of the Royal NZ Astronomical Association to upgrade the skills of locals who wish to become involved in astronomy and work towards enhancing the experience of visitors who come to appreciate the island's dark skies. Semi-permanent data monitoring systems were installed in the centre of the island.

2. GOVERNANCE

Governance questions are still being worked through. The Local Board has established a Dark Sky Advisory Group which is representative of the island's stakeholders and astronomical community, and individuals with particular skills and interests being invited to join. Regulatory and Monitoring functions arising from the Sanctuary status will rest with Auckland Council. The precise structure will depend on finalisation of the Barrier's inclusion into the Auckland Unitary Plan. The timetable for this process has not been finalised, but there is active liaison between the Dark Sky team and the appropriate Council officers.

3. OUTREACH AND PUBLIC COMMUNICATION

a. Dark Sky Announcement and Inauguration

The Barrier community came together to celebrate the inauguration in fine style on 19th August, 2017. The event was widely publicised in the national media. A national television programme (TV3/ News Hub) carried interviews with the Local Board, the Dark Sky team, and local residents. Radio New Zealand (RNZ) sent a reporter for in-depth coverage of the entire event. Other national media picked up on the story, and a sample of the stories is available in Appendix A. Over 300 people attended the inauguration. This represents approximately 30% of the permanent population of the island. Support for the project was enthusiastic and emphatic. Details of the launch are outlined in the Activity Table as Appendix B. National media also covered the award in considerable detail when the status was first announced to the media on June 23, 2017. Auckland Council's first press release was picked up internationally by media, astronomers, conservationists, and travel organisations.

b. **Installation Art and the Art Community**

The island's airport terminal has been substantially modified to incorporate the Dark Sky imagery into the island's welcome. Installation art representing windows on the dark sky have been mounted on the terminal's ceiling. The tourist information section (the I-Site) has been completely redesigned with walls covered with a large photographic section of the night sky. Temporary IDA signage has been installed in the I-Site, and formal permanent signage is being planned. For the inauguration the Local Arts and Heritage Village sponsored an art project in the 3 local primary schools, and this was put on display in the gallery for the week of the inauguration. The local artistic community also joined in the theme, and several substantial art works and a range of craft material was prepared for the inauguration and for the coming summer season.

c. **Liaison with Aoraki-Tekapo**

Two representatives of the Aoraki-Tekapo Dark Sky Reserve, Margaret Austin and Steve Butler attended the launch and established an important relationship with the Barrier's team. They met with local members of the Board's Dark Sky Advisory committee to discuss the application process, governance structures and issues, monitoring and regulatory issues, and social impact questions. GB's Dark Sky team members will be presenting a paper at the coming Starlight Festival at Mt Cook in the Aoraki-Tekapo region.

d. **Presentation Book: SANCTUARY**

The Dark Sky team decided to write and produce a presentation book to mark to inauguration. **Sanctuary** adapts the story of the application process and provides a vivid photographic and textual record of the island at this significant point in its history. Proceeds from this book are to be donated back into the community to assist the funding of an Information centre and resources. The authors of the book, Gendie and Richard Somerville-Ryan, and Nalayini Brito and Gareth Davies were the Dark Sky Team who had done much of the work in preparing the application. They donated their work and the design work to Destination Great Barrier for the first print-run to promote the island as a dark sky destination and to promote the awareness of the sanctuary and its objectives among the Barrier's residents and the wider Auckland community. The photographic work was donated by three local and off-island photographers: Shaun Lee, Mark Russell, and Blair Quax. The book is being distributed throughout the astronomy community in New Zealand and is available at art and tourism outlets on the island and elsewhere.

4. **LIGHT MANAGEMENT PLAN AND MONITORING**

Nalayini Brito Davies, an IDA member and member of the Barrier Dark Sky team has undertaken continuous data collection since the awarding of the Sanctuary status. Her preliminary report on these data is available in Appendix C. The team is considering establishing a second permanent data collection system at the south of the island, Tryphena. Tryphena is on the East side of the island, and would potentially be more affected by the spill over light from Auckland city. It is also a more densely inhabited area. Team members have informally assessed a number of issues as part of a wider process of bringing the community up to speed with the sanctuary's concerns. On a bright note, it was found that all light bulbs available at the local hardware store met the IDA specifications, (<3000degrees Kelvin). The

team is committed to working with major lighting sites, the clubs, the Department of Conservation (DOC) marshalling yard, and some commercial outlets to develop practical analysis and options for their lighting needs. Discussions to date have been cooperative and enthusiastic. Team members are familiarising themselves with Aoraki-Tekapo's solutions to some issues. Local electrical contractors have joined discussions in anticipation of an advisory function to help landowners meet pending requirements. The ethos of the island community is emphatically one of seeking positive cooperation before regulatory imposition. The Local Board firmly believes that its community responds best to common sense and cooperation.

5. OUTREACH ACTIVITIES

With the coordination of the local astronomy group, an Introduction to Astronomy Course was run by John Drummond, the President of the Royal New Zealand Astronomical Association. The course was delivered to a representative sample of island residents. The course was held over the weekend of 15-16 July, and the night sky cooperated. The GBI Astronomy Group has continued public evenings and increased its equipment with the addition of a pair of 25x100mm binoculars and tripod mounts.

Appendix A

Stuff report

23 June 2017

Note: includes city lighting which is not Barrier. But photos of Orla, and good local commentary.

<https://www.stuff.co.nz/travel/destinations/nz/94001815/great-barriers-exceptional-starry-nights-recognised-with-dark-sky-sanctuary-status>

Stuff Report

August 20, 2017

<https://www.stuff.co.nz/science/95959306/great-barrier-island-recognised-as-a-dark-sky-sanctuary>

Youtube Clip

Tryphena Harbour & Kaitoke Beach

<https://www.youtube.com/watch?v=H814cVVVz3o>

OUR Auckland Civic Publicity Monthly publication from Auckland Council

June 23, 2017

<http://ourauckland.aucklandcouncil.govt.nz/articles/news/2017/06/great-barrier-awarded-rare-international-dark-sky-sanctuary-status/>

Newshub Article Janika Ter Allen

August 18 2017

<http://www.newshub.co.nz/home/new-zealand/2017/08/dark.html>

Lonely Planet Article

After June's press releases. Includes links to IDA

<https://www.lonelyplanet.com/news/2017/06/28/great-barrier-island-dark-sky-sanctuary/>

Go Great Barrier & Good Heavens

Post launch: local tourism venture with the first Dark Sky Ambassadors

<http://www.greatbarrierislandtourism.co.nz/dark-sky-sanctuary-great-barrier-island/>

Conde Nast Traveller

June 29 2017

<https://www.cntraveler.com/story/new-zealands-great-barrier-island-named-international-dark-sky-sanctuary>

Herald Initial leading story after application (leaked, but adopted as a positive news story)

May 9, 2017

http://www.nzherald.co.nz/business/news/article.cfm?c_id=3&objectid=11852349

Herald News release of Inauguration

August 20, 2017

http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=11907735

Vacations & Travel Magazine

June 30

<http://www.vacationsmag.com/worlds-first-international-dark-sky-sanctuary-island/>

Tourism Ticker

June 26, 2017

<http://tourismticker.com/2017/06/26/great-barrier-awarded-international-dark-sky-sanctuary-status/>

DGBI's New Web Site

<https://www.greatbarriernz.co.nz/dark-sky-sanctuary-great-barrier-island/>

TVNZ

June 22 TV broadcast and newscast link

<https://www.tvnz.co.nz/one-news/new-zealand/watch-mean-great-barrier-kiwi-island-become-star-gazers-delight-new-dark-sky-sanctuary-recognition>

TTR Weekly

June 2017

<http://www.ttrweekly.com/site/2017/06/dark-side-of-new-zealand/>

Adventure Womens

August

<http://www.adventurewomen.com/blog/article/great-barrier-island-womens-vacations-to-new-zealand/>

Radio NZ

June

<https://www.nzgeo.com/audio/great-barrier-island-becomes-nzs-second-dark-sky-sanctuary/>

The Adventure Journal

June/August

<http://theadventurejournal.com.au/?p=658>

Good Heavens & Aotea GBI Website

<https://www.greatbarrier.co.nz/activity/dark-sky-inc/>

MotorHomes & Caravans Publications and Web-site

<https://www.nzmcd.co.nz/news/1706/great-barrier-island-designated-as-international-dark-sky-sanctuary>

Stardome on celebrations

<https://www.stardome.org.nz/2017/08/celebrations-on-great-barrier-island/>

Travel and Tour World

<http://www.travelandtourtworld.com/news/article/great-barrier-island-new-zealand-gains-international-dark-sky-status-2/>

Travel 9 au

<http://travel.nine.com.au/2017/07/06/09/55/dark-sky-reserve-new-zealand>

Gulf Journal (Tim Higham) Hauraki MarinePark Area

<http://gulffjournal.org.nz/article/dark-sky-bid/>

Scoop

<http://www.scoop.co.nz/stories/AK1706/S00542/great-barrier-awarded-rare-status.htm>

Science/Technology/Travel

<http://www.star2.com/living/science-technology/2017/07/14/new-zealand-island-watch-stars/>

Ben Assado's Photography and write-up of the launch

<https://greatbarrierphotography.com/dark-sky-sanctuary-award-for-aotea/>



FLY My Sky

So - let's go



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The Barrier BULLETIN

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THE WONDERFUL WIZARD OF IZZ.

Local Board Chair Izzy Fordham casting stardust over the crowd at the celebrations opening the Dark Sky Sanctuary.

Also, the Independent Police Conduct Authority tell us what most already knew.

Kaitoke Schools wearable arts produces creatures the likes of which the island has never seen.

And Also...



The Bulletin is of course read everywhere, but in Buenos Aires there is talk of it being banned as the locals become so excited reading it that they are quite likely to break into an impromptu Tango in the middle of the road..... or anywhere!

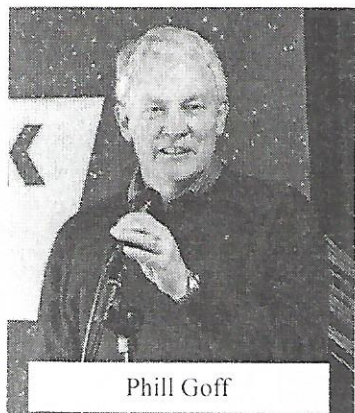
AOTEA FM



Deadline For Next Barrier Bulletin
Monday September 18th

Dark Sky Sanctuary Launch

On Saturday 19 August, the Claris Sports Club was packed for the community launch of our Aotea / Great Barrier Island International Dark Sky Sanctuary IDA accreditation celebration. Under the direction of local lad Sinclair Lonsdale, the clubroom was transformed into a space fitting for the occasion. Big thanks to Gordon, Chrissi, Ben, Steve, Artie and Ngaire for the muscle, music and can do. Not to forget Nell and the kids for the space artworks and all the kids who sat up front and sang on the day.

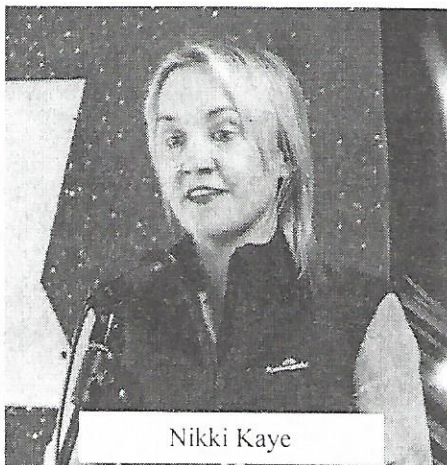


Phillip Goff

The community came out in force to enjoy the celebrations and took advantage of chatting to the experts from ASTRONZ, the Auckland Astronomical Society and Stardome who had set themselves with an Expo in the Conference Room along with Janene's Ice Dreams, Wayne Renner from Nevana Designs who specialize in photo

luminescent products and Destination Great Barrier Island selling various starry focused goods.

Auckland's Mayor Phil Goff, joined for the celebrations along with our local MP Nikki Kaye, our Ward Councillor Mike Lee, Chair of Ngati Rehua Ngatiwai ki Aotea Trust Board Nicola MacDonald accompanied by Bruce Davis,



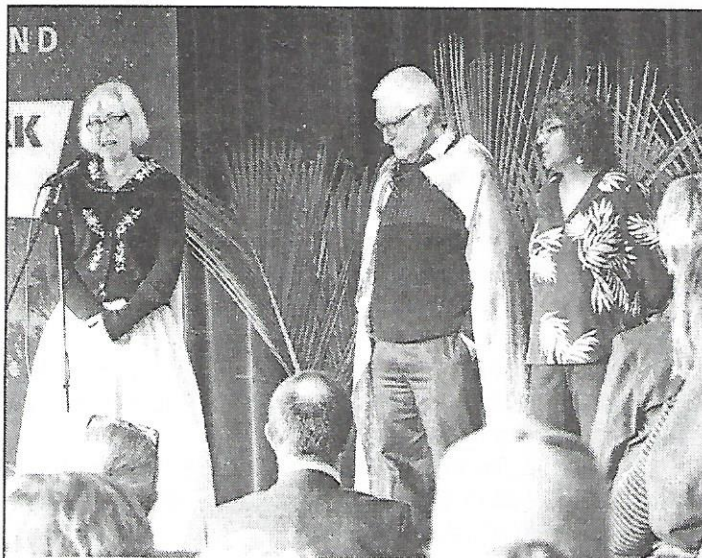
Nikki Kaye

Aoraki Mackenzie Dark Sky Reserve reps Hon Margaret Austin and Steve Butler all of whom took part in the official side of the day to be rewarded with a dousing of silver stars.

It's not often you can send the Mayor home sparkling in glitter! John Barentine from the International Dark Sky Association couldn't be with us as he was chasing the solar eclipse in the States but sent though some words that were read out by Local Board Chair Izzy Fordham that well and

truly resonated with everyone.

Mayor Phil and Nikki Kaye had the honour of popping two large balloons filled with golden confetti to declare open the recognition of our Sanctuary. Afternoon tea was provided by our catering experts Andy, Mairehau & Michele and the cutting of Kat's rather large starry cake then took place. Board member Shirley Johnson handed out prizes for the best dressed, among those were Janene (for her sparkling coat) and Ann Petersson (for her inspired NASA outfit).

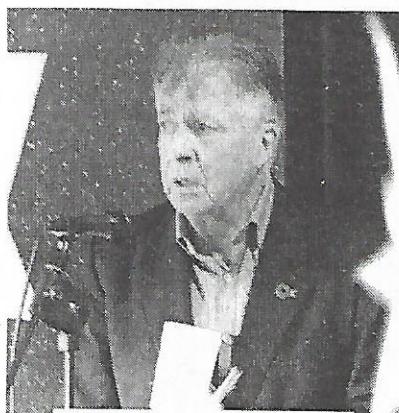


Gendie, Richard and Nalayini

We also saw the launch of a beautiful book "Sanctuary" written by Richard and Gendie Somerville-Ryan, Nalayini and Gareth Davies that takes you through what the process entailed and some absolutely amazing photographs courtesy of Blair Quax, Mark Russell and Shaun Lee. Copies of the book are available at various outlets on the island but if you can't track one down just pop into the Information Centre at Claris airport.

The biggest acknowledgement for day remains with Richard and Gendie for the phenomenal amount of work they put into making this happen. To Nalayini for her time and energy in putting the science together for us from the data that was collected and her husband Gareth for his support. The images of photographers Blair, Mark and Shaun have left us all spellbound and wanting more, once again your time and energy is appreciated.

Acknowledgements also go to John Barentine for his guidance and advice, Destination Great Barrier Island, Awana Rural Women, DOC, Auckland Council Planning Committee and Planners for their advice, Sinclair Lonsdale for his artistic skills, ATEED especially Lynne Butler and our Local Board both the current and previous and of course, to the community of Aotea / Great Barrier Island for embracing this amazing achievement. On a global scale we are the only island in the world to receive this Sanctuary accreditation –



A Message from John Barentine

Programme Manager IDSA

It's personally gratifying to see Aotea Great Barrier Island take its place as only the third International Dark Sky Sanctuary, and the first in New Zealand, ever so designated by IDA. GBI is very nearly everything we might want in a Sanctuary: a land largely insulated from the pressures of modern society where people live "off the grid", finding both great meaning in the slow pace of life there as well as treasures among its various natural resources. External recognition of the island's dark nights, full of the wonder that must have confronted both its Māori and European settlers, is a validation of the efforts undertaken by many people, both island residents and their counterparts on the mainland, to highlight the fragility of GBI's natural darkness.



The only casualty of the day.....The huge cake.

deep darkness of nights on the island the skies spangled with thousands of brilliant stars, and a rich astronomical tradition reaching back over a thousand years will be known to New Zealanders of a thousand years from now. While names may be forgotten, perhaps those people will give thanks for the work that starts now in preserving something we hope will be cherished for a long time

I wish I could be with you all in person today to share in the celebration of this tremendous achievement. On behalf of the IDA Board of Directors, and over 3,000 IDA members worldwide, please accept our sincere thanks for your work, and our congratulations on establishing the Aotea / Great Barrier Island International Dark Sky Sanctuary

John Barentine – International Dark Sky Association



*Above & below
Most amazing dress. Ann Petersson and Janene Hunsdale.*

Humanity stands at a crossroads unlike any other we have encountered in our history as a species. We are pulled this way and that by the forces of factionalism that would have us believe we're less like each other than we really are. The prospect of a rapidly changing climate looms large as a challenge we are ill-prepared to face. The world seems like an increasingly dangerous, unpredictable place, hurling us toward an uncertain future at a steadily intensifying pace. Even while human ingenuity, and the technology it produces, enables new powers of which our ancestors couldn't possibly conceive, we recognize that our own smarts threaten elements of the world — and of nature, in particular — that we have long held sacred and inviolable. Despite marching forward in the name of 'progress,' we take steps backward as we lose touch with the aspects of our world that make us fully human. As we lit thousands of cities while ushering in a new, modern era, the nights grew brighter, the stars more distant, and the beguiling mystery of night yielded to a drab certainty of day.

In Aotea, we figuratively plant a stake that helps us draw a boundary, behind which we hope to hold back something of value to hand off to not only our immediate descendants, but people who will follow us so far in the



Activity Diary 2017

2017

- May 2017 Official notice that Aotea/Great Barrier Island has been awarded Dark Sky Sanctuary status
- 23 June General announcement in the national media.
Interviews with 2 of the Dark Sky team, Richard & Gendie Somerville-Ryan, broadcast nationally on TV3. National newspapers picked up the press statements with short articles and local photographs. Statements are subsequently adopted by international tourist and travel web-sites.
- 15-16 July **Introduction to Astronomy.**
Two-day day/evening course held at **Marion Barleyman's** Cottage to upskill a core group of Dark Sky Ambassadors. The course recognises the fact that the level of astronomical skill on the island is extremely low. However, the goal of the Dark Sky team is to develop a pool of local people able to run basic, scripted night sky viewing sessions for the introductory level visitor market. The course was developed and run by the President of the Royal NZ Astronomical Association, John Drummond. There were initially 22 participants, and a waiting list of 10. However, on the second day a group of 4 children from one of the maraes joined in and participated fully in the programme for day 2 including the practical astronomy exercises in the evening.
- 19 August **Official Inauguration of Aotea/Great Barrier Dark Sky Sanctuary.**
The inauguration became a major event for the island. Approximately 300 residents attended (out of a total population of 940). The event was covered widely in the national press and media. The Dark Sky team were interviewed by Radio New Zealand, Newshub (the news wing of TV3 and the ZM national radio network). The island's newly prepared ambassadors acted as hosts for the TV crew, introducing them to a perfect night sky with the island's specialist photographer. Auckland Council's marketing division ATEED. The inauguration was held at the Claris Sports and Social Club with the adjoining small Claris Conference centre used as a display and activity hall. The official party for the inauguration included, Phil Goff, the Mayor of Auckland City, Nikki Kaye (Minister of Education and local MP), Margaret Austin (Former Chair of the Aoraki-Tekapo Dark Sky Reserve Trust), Steve Butler (IDA member, and member of the Aoraki Trust), Nicola MacDonald (Chair of Ngati Rehua-Ngatiwai Ki Aotea Trust), Bruce Davies (kaumatua, and member Ngati Rehua-Ngatiwai Ki Aotea Trust); Izzy Fordham (Chair of the Great Barrier Local Board) and members of the local board: Sue Daly, Jeff Cleave, Shirley Johnson, Luke Coles; and the Dark Sky Team: Gendie and Richard Somerville- Ryan , and Nalayini Brito-Davies. The inauguration included a traditional Maori welcome and prayer, waiata (songs) from the local school children, and formal speeches. The island's quirky nature showed itself as a large number of island residents had dressed on a star theme, and the inauguration was formally marked by exploding two large balloons filled with foil stars which were blown throughout the club hall. A large birthday cake on a star

theme was the focal point of a celebratory party which continued throughout the afternoon and into the evening. The Auckland Astronomical Society and Stardome sent a small van with telescopes, binoculars, interactive models, ...get details... In the evening the ambassadors were called on to test their skills as the weather had cleared giving us a perfect night sky and a stunning milky way.

20 August

Preliminary Governance meeting with Aoraki-Tekapo Trust members

The chair of the local board, two of the dark sky team, and a representative of Auckland City's marketing division ATEED, met with Margaret Austin and Steve Butler from the Aoraki-Tekapo Trust to get a briefing on governance and management issues for the Aoraki-Tekapo Reserve and to begin the process of formalising the governance structures for the Sanctuary on Aotea-Great Barrier Island.

Aotea/Great Barrier Island Sky Quality Monitoring

Approach:

Recognising the combined impact of weather dependency and infrastructural challenges in mounting a monitoring campaign, starting April 2017, an innovative and custom-designed continuous monitoring system was implemented for GBI. This approach has not only allowed the collection of comprehensive data but it has also minimised the cost, time taken and human error.

As the previous measurement campaign showed the night sky brightness of the entire island to be consistent, a central, relatively typical location within the island, viz. 81 Hector Sanderson Rd, Claris, was selected as a suitable representative location.

Measurements:

The measurements selected for the purposes of this report are for the new moon day of each month, between the hours of morning and evening astronomical twilight.

Date	No. of readings	Average measure (mpsas)	Standard Deviation (mpsas)	Minimum (mpsas)	Maximum (mpsas)
27/04/2017	61	21.37	0.16	20.97	21.73
26/05/2017	61	21.48	0.08	21.19	21.64
24/06/2017	66	21.50	0.24	21.04	21.80

The above data shows the mean measurement for the period April to June 2017 to be 21.5 mpsas although variations up to 0.76 mpsas during the measurement period of 6-7 hours were observed.

Discussion:

Although this specific location was not previously measured, nearby locations, measured under excellent weather conditions on an exceptionally dark night in October 2016, averaged 21.7 mpsas .

The possible reasons for the 0.2 mpsas difference between the April- July 2017 and October 2016 measurements could be due to a combination of the following:

- atmospheric variations during the night as the time range of the 2017 measurements (188 measurements over 6-7 hours) is substantially larger than the time range of the 2016 measurements (23 measurements in about 5 minutes)
- the consistent practice for GBI of not adjusting for the impact of the Milky Way which could range from 0.1-0.3 mpsas with the greater impact taking place during winter months
- possible seasonal impact of passing clouds and/or rain during the 6-7 hour measurement periods
- impact of considering the data for just new moon days - these may not have been the best (darkest with the most favourable atmospheric and location conditions) night for each month
- equipment error margin of +/- 0.2 between the two measurement units

The current monitoring approach with data gathered over a long continuous period is a much more robust, reliable and realistic method of assessing the true condition of the night sky. Detailed analysis of a full year's data covering all seasons supplemented by a specially mounted monitoring campaign repeating the October 2016 in-person island-wide methodology is expected to provide robust conclusions and reliable consistent comparison against the baseline then established.



Nalayini Davies
Astronomer