Summary of 7th UV Science Workshop

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Abstract. We provide a short summary, including scientific highlights, of the NIWA-sponsored 7th UV Science Workshop, which was held at the James Cook Grand Chancellor Hotel in Wellington from 4-6 April 2018.

Introduction

The Workshop was highly successful, with 85 registrants and 44 presentations. These were similar numbers to the previous Workshops (Table 1), but international interest continues to grow. Lead authors for nearly half of the presentations were from outside New Zealand (15 from Australia, 2 from Japan, and 1 each from UK, Germany, and USA).

Table 1. Comparisons with previous workshops

Year	Papers	Registrants	Location	Non NZ 1st author
1993	19	?	Christchurch	2
1997	23	?	Christchurch	2
2002	40	79	Christchurch	5
2006	54	63	Dunedin	15
2010	58	78	Queenstown	15
2014	48	90	Auckland	19
2018	44	85	Wellington	20

After a convivial ice-breaker event on the evening of 4 April, the workshop was opened with a mihi whakatau from Kaumatua Peter Jackson (Figure 1), representing the tangata whenua from Te Atiawa rohe (i.e., the wider Wellington region).

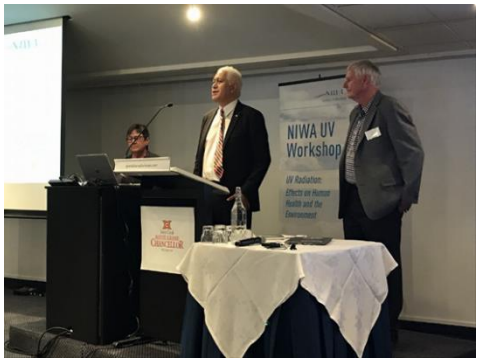

Figure 1. Kaumatua Peter Jackson with Louise and Richard McKenzie at the Workshop opening

Figure 2. Some of the participants

Scientific Highlights

As in previous Workshops, there was a huge diversity of presentations, because UV radiation is at the crossroads of many research and health fields. Of special relevance to NIWA were the findings that without action on protecting the ozone layer, UV levels would by now have been 20% more than when measurements began in 1990. But because of the success of the Montreal Protocol to protect the ozone layer, any changes in levels of UV radiation in the New Zealand region over that period have been small and within the year to year variability due to clouds. Despite this success, a full recovery of stratospheric ozone is still decades away. It was re-stated that the springtime Antarctic ozone hole lies far to the south of New Zealand; and at the time of the ozone hole, ozone levels in New Zealand are as high as anywhere in the world.

We heard that international responses to increasing greenhouse gases are much more difficult but that lessons learnt from the Montreal Protocol, and actions taken by it, will help mitigate some of the effects on global climate. The effects of climate change are expected to accelerate ozone recovery, but that will be of 'cold' comfort to those affected by rising temperatures, sea levels, ocean acidity, and storm severity.

The first day ended with some words from NIWA's CEO John Morgan reiterating NIWA's commitment to UV monitoring and reporting as a key part of NIWA's core business.

Other papers addressed concerns about the way information on levels of UV radiation is reported. It was noted that the current WHO INTERSUN advice, that "no protection is required if the UV Index is less than 3" (as in

the UV Alert), is flawed. This is because during the New Zealand winter months of June and July, the UVI is always less than that threshold, yet, UV doses exceeding the threshold for damage to fair skin can usually be obtained.

We heard of several exciting new technologies that are under development, including new instruments to measure personal exposure to UV radiation, smartphone apps to inform people on current UV levels (including analyses of their performance), and hand-held devices to diagnose skin cancer.

There were lively discussions on the role of vitamin D. Since the previous workshop, our understanding of its role has been clarified by new results from clinical trials. It appears several of the adverse health effects from low vitamin D are associated only with very low levels of circulating 25(OH)D, so are less important for the general NZ population. Thus, supplementation advice should be targeted to at-risk groups, such as the institutionalised elderly, ethnic groups with darker skin, and those that regularly wear clothing that covers nearly all skin for cultural reasons. This advice is consistent with the Ministry of Health's Consensus (2012) and Companion (2013) Statements on Vitamin D and Sun Exposure in New Zealand. Interestingly, one paper showed huge disparities between the effects of melanin on sun protection versus vitamin D production. Other papers showed that vitamin D deficiency is potentially an important issue in Japan and Germany. In Japan, for example, many young women actively cover-up to maintain a pale complexion and reduce their risk of wrinkles and pigmented spots. An unintended consequence of their active sun avoidance is an increased risk of vitamin D deficiency and an increased risk of craniotabes in Spring time births.

Several papers investigated the importance of shade (both natural and built), and how to quantify its effects on exposure to UV radiation. The importance of providing warm shade in New Zealand's temperate climate was noted.

There was only one paper discussing environmental effects other than on human health. This discussed environmental stresses on clover, which is one of our most important agricultural plants in New Zealand. It showed that there are strong links between protection against UV damage (caused by ozone change) and protection against drought stress (caused by climate change). Cultivars of clover that are resistant to both have been developed.

The final presentation of the workshop was an excellent summary by Craig Sinclair from Cancer Council Victoria, Melbourne. He noted that he will bring the important points that arose to the attention later this year of WMO and WHO committees, for which he is the Australasian representative.

Prizes were awarded for the best talks on each day. These reflected the international flavour of the meeting. The two speaker prizes went to Dr Michel Nieuwoudt (University of Auckland but from South Africa originally) and Dr Hideaki Nakajima (NIES, Japan), while Dr Stuart Henderson (ARPANSA, Melbourne), won the prize for the best poster.

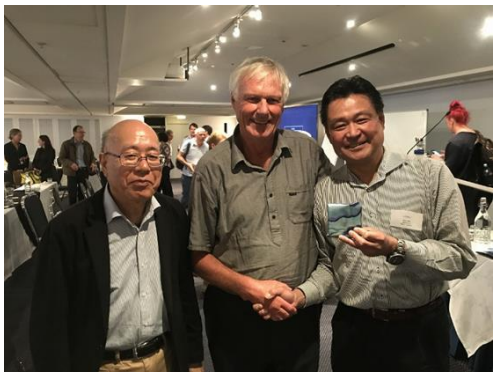

Figure 3. Prof Toshimasa Kawanishi with Richard McKenzie congratulating prize-winner Dr Hideaki Nakajima.

Discussion

The only disappointments were the lack of political interest in the Workshop, and the rather limited media interest. We were unable to persuade a Minister to open the event; and the Dominion Post was the only news agency that followed up on it. This is a concern because investment in prevention is required. As with all other forms of cancer, mortality rates for melanoma in NZ are greater than in Australia. The annual mortality from skin cancer in New Zealand is comparable with that from road deaths, and incidence rates are more than twice those in USA, and three times more than in the UK. And New Zealand has over 90,000 cases of non-melanoma skin cancer per year. Over-exposure to UV radiation in summer is a major risk factor for skin cancer, and the costs of health treatment alone in New Zealand run into tens of millions of dollars per year. Skin cancer is thought to be largely preventable, and benefits from investment into prevention could be huge.

Conclusions

There is still a lot to do to educate the general public about sun protection, particularly the regular and appropriate application of sunscreen, and the use of shade and clothing as well as about UV in particular, as there are clear misunderstandings about what the UV index means and when sun protection is required.

Extended abstracts of all presentations will be made available, after peer review, on the NIWA web pages (https://www.niwa.co.nz/events/uv-radiation-effects-on-human-health-and-the-environment-2018).

Acknowledgements

We are grateful to our co-sponsors; the Cancer Society of New Zealand (CSNZ), the Health Promotion Agency (HPA), the Australian National University (ANU), the University of Auckland (UA), Melanoma Network of New Zealand, and the New Zealand Dermatological Society. These groups were well represented at the meeting, and the feedback we have received has been very positive.

Thanks also to the NIWA publicity team at Wellington, and to Mike Kotkamp from NIWA's Lauder Atmospheric Research Station for technical assistance during the event.