



Tahiti Deployment vs. Planned New Zealand Deployment

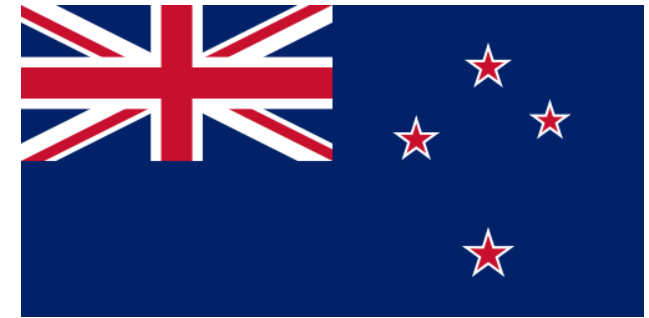
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Pre-Deployment Assessment

- Originally, the Summer 2021 Southern Deployment was to be out of New Zealand, and proposals were accepted based upon that assumption (for GREAT and HAWC+)
- COVID travel restrictions made it too difficult to Deploy to New Zealand
- Prior to the decision to use Tahiti as a potential backup Southern Deployment location we ran simulations of how science productivity would be affected



NEW ZEALAND



TAHITI

Pre-Deployment Assessment

GREAT	New Zealand		Tahiti	
	Fraction of target pool completed	Sum of science leg durations	Fraction of target pool completed	Sum of science leg durations
High Priority Programs	72%	83 hrs	68%	73 hrs
Priority 3 + Surveys	28%	32 hrs	32%	35 hrs

The above table shows that for a 16-flight GREAT series in Jul-Aug of 2021 we would have comparable productivity out of Tahiti vs. New Zealand

NOTE: These statistics assume 10-hr flights

Pre-Deployment Assessment

HAWC+	New Zealand		Tahiti	
	Fraction of target pool completed	Sum of science leg durations	Fraction of target pool completed	Sum of science leg durations
High Priority Programs	93%	64 hrs	84%	55 hrs
Priority 3 + Surveys	7%	4 hrs	17%	10 hrs

The above table shows that for a 12-flight HAWC+ series in Jul-Aug of 2021 we would have slightly worse productivity out of Tahiti vs. New Zealand

NOTE: These statistics assume 10-hr flights

Pre-Deployment Assessment

We also compared the observing conditions of the two sites.

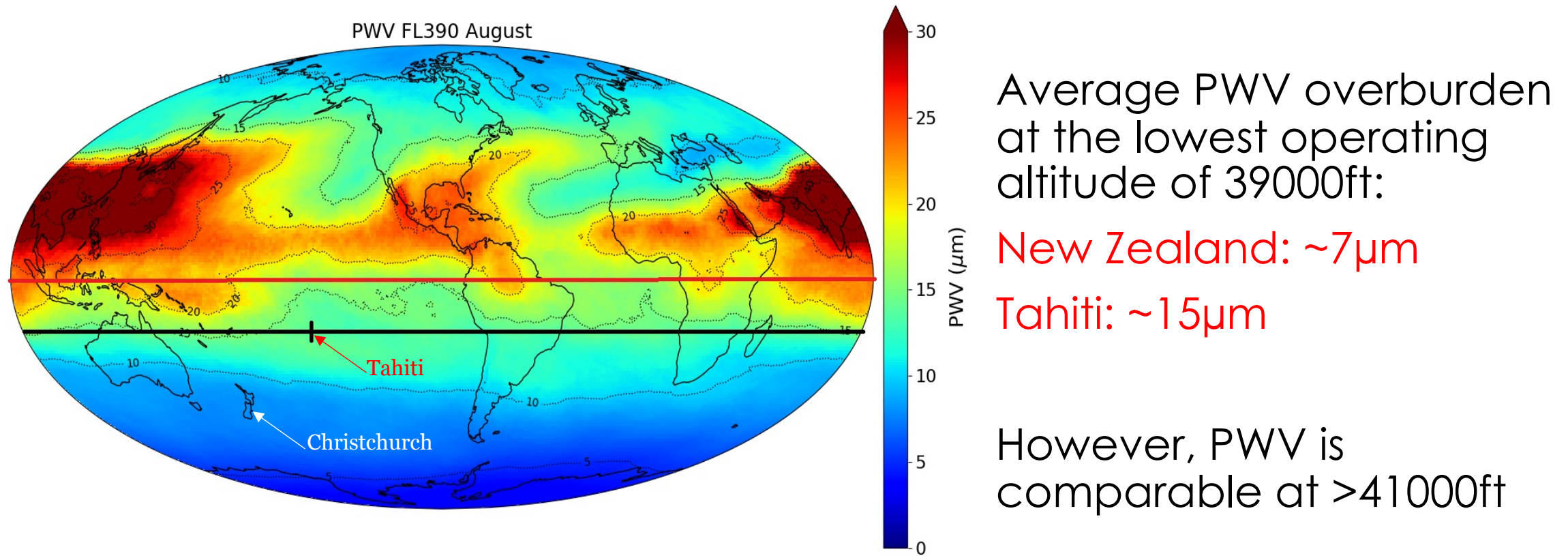
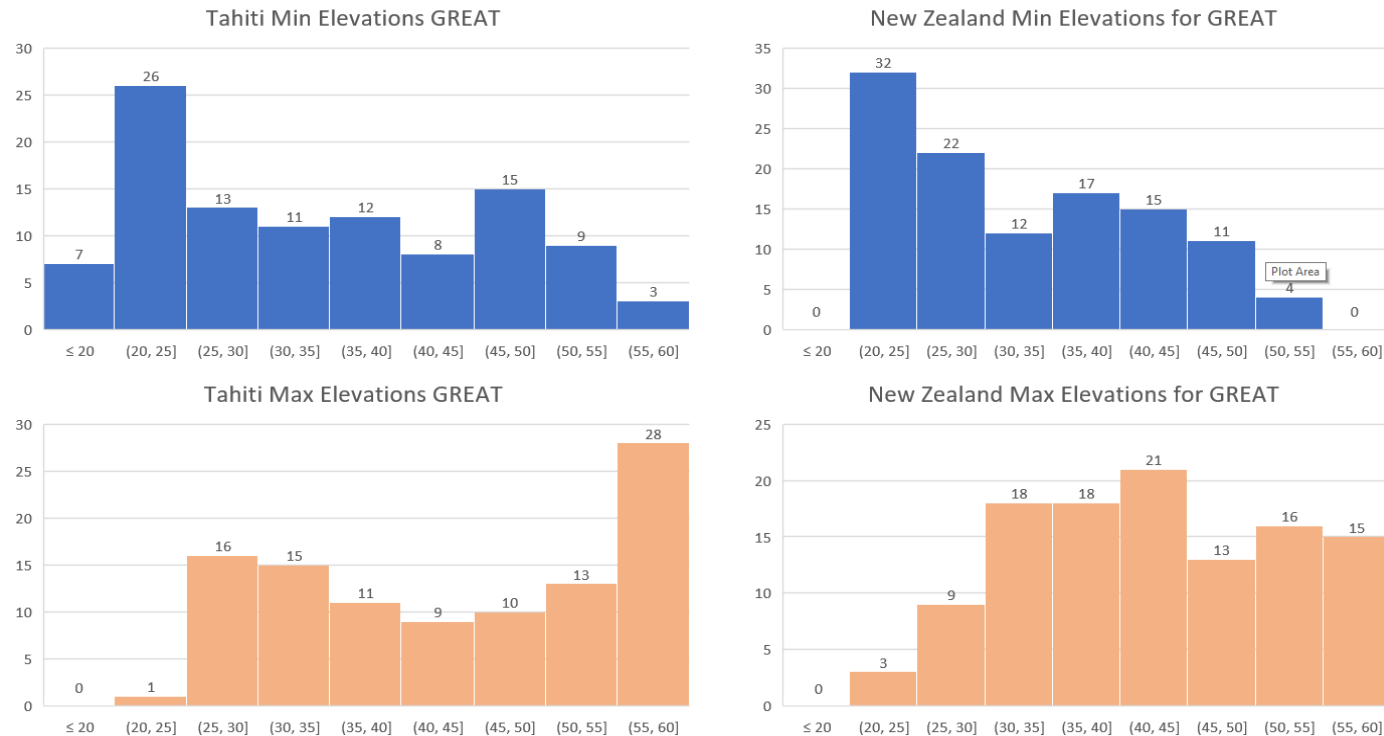


Figure 1. Global water vapor overburden averages at our lowest operating flight level for science (39,000 ft) in August. Red line is the equator. Black line is the latitude of Tahiti; the black vertical line segment marks the longitude of Tahiti.

Pre-Deployment Assessment

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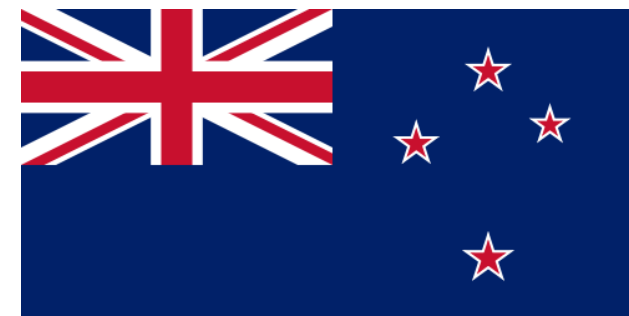
We also looked at whether or not we would be observing through worse telescope elevations from Tahiti.

The elevations for the observations appeared comparable.

Figure 3. Histograms showing GREAT observation elevations for every flight leg planned. Left two plots are for Tahiti, right two plots are for New Zealand. Top plots are for minimum elevations of all observed targets, and bottom plots are for maximum elevations of all observed targets.

Pre-Deployment Conclusions

- Based on the assessment, we concluded that Tahiti was a fully viable alternative for the 2021 summer deployment



NEW ZEALAND



TAHITI

Tahiti Deployment: What actually happened

- Because Tahiti is so remote, we learned that we needed to carry a large amount of reserve fuel
- This had the unfortunate consequence of keeping us at lower altitudes for longer, and restricted us to 8.5 hr flight durations (instead of 10 hrs)
- This cut into our observing time:
 - In the 13 flights we achieved 80 RH, compared to potentially 115 RH out of New Zealand

Tahiti Deployment: What actually happened

- With GREAT, and were able to get 13 of the 16 planned flights, but had to return to Palmdale early due to COVID outbreak in Tahiti
- HAWC+ lost its southern observing opportunity altogether
 - We quickly devised a flight series out of Palmdale, a potentiality we had foreseen and for which we had made a positive assessment of.