



**Twenty Second Meeting of the
Informal South Pacific ATS Co-ordinating Group (ISPACG/22)**

Papeete, Tahiti, 12-14 March 2008

**Agenda Item 4: Review Open Action Items
AI 21-6**

Wind Modelling in Oceanic Regions

Presented by the Federal Aviation Administration

SUMMARY

This paper reports on past analysis and recommendations regarding the Pacific wind model in the FAA's oceanic system.

1 Introduction

- 1.1 In 2006, the FAA's Weather Research Program sponsored an analysis of wind forecasting and modelling accuracy in the oceanic environment. This analysis was conducted by the US Naval Research Laboratory (NRL). A summary of this analysis, findings and recommendations is documented below.

2 Discussion

- 2.1 The 2006 analysis compared the Navy global weather prediction model flight level wind against with observations (rawinsonde) for different regions (e.g. tropics, mid-latitudes etc) for the period 2003 to 2005. The NRL team also examined the satellite wind error statistics routinely published by the major global weather prediction centers. The flight level wind statistics compilation is now underway to extend the study from 2005 to present.
- 2.2 The study concluded that, although the wind forecast model is sound, the accuracy of the forecast deteriorates over time. Although this result was expected, the study provided data to support this conclusion and identified an error margin of roughly double the error margin in wind forecast over 72 hours. Consequently, more frequent and shorter duration wind forecast models are preferred.
- 2.3 In order to provide the necessary data for more frequent updates to the wind models, the study recommended the inclusion of Satellite wind data into the hourly wind model update cycle. The study noted that Satellite wind data was comparable in error statistics to rawinsondes and aircraft data, while providing better horizontal coverage for mesoscale data at flight levels.
- 2.4 As a result of this study, inclusion of satellite wind updates into the FAA's oceanic wind model is currently under consideration.

3 Actions by the meeting

The meeting is invited to:

- 3.1 Note the information provided in this paper regarding the NRL wind data analysis.
- 3.2 Note the recommendation that oceanic wind models include updates from Satellite wind data.
- 3.3 Consider further analysis of wind modelling in the systems supporting oceanic air traffic services.

Attachment: Data sample from the NRL oceanic wind analysis

Tropics (25S-25N), JAN 04/05, U-Wind, Fcst-Obs Statistics

press(mb)	Bias m/s				
	tau=0hr	tau=12hr	tau=24hr	tau=48hr	tau=72hr
30	0.0	0.2	0.4	0.6	0.9
50	0.1	0.4	0.5	0.7	0.8
100	-0.5	-0.5	-0.6	-0.7	-0.8
200	-0.4	-0.7	-0.8	-0.9	-1.0
250	-0.3	-0.6	-0.8	-0.9	-0.9
300	-0.2	-0.5	-0.7	-0.8	-0.8
500	-0.2	-0.3	-0.3	-0.3	-0.3
700	-0.2	-0.3	-0.4	-0.7	-0.9
850	-0.6	-0.9	-1.2	-1.5	-1.6
1000	-0.5	-0.8	-0.8	-1.0	-1.1

press(mb)	SD m/s				
	tau=0hr	tau=12hr	tau=24hr	tau=48hr	tau=72hr
30	3.6	4.2	4.5	4.8	5.1
50	3.3	4.4	4.8	5.2	5.3
100	3.7	4.8	5.2	5.6	6.1
200	3.3	4.4	5.0	5.6	6.2
250	3.0	3.9	4.5	5.2	5.8
300	3.0	3.8	4.2	4.8	5.3
500	2.5	3.3	3.5	3.8	4.1
700	2.2	3.2	3.3	3.6	3.8
850	2.2	2.9	3.2	3.4	3.7
1000	2.1	2.8	2.9	3.0	3.1

press(mb)	RMSE m/s				
	tau=0hr	tau=12hr	tau=24hr	tau=48hr	tau=72hr
30	3.7	4.2	4.5	4.9	5.2
50	3.3	4.4	4.9	5.3	5.5
100	3.7	4.9	5.3	5.7	6.1
200	3.4	4.5	5.1	5.7	6.3
250	3.0	4.0	4.5	5.3	5.9
300	3.0	3.8	4.3	4.9	5.4
500	2.5	3.3	3.5	3.8	4.2
700	2.2	3.2	3.3	3.6	3.9
850	2.3	3.1	3.4	3.8	4.1
1000	2.1	3.0	3.0	3.2	3.3

No. RAOBS

press(mb)	No. RAOBS				
	tau=0hr	tau=12hr	tau=24hr	tau=48hr	tau=72hr
30	2,715	2,715	2,669	2,574	2,483
50	3,077	3,077	3,028	2,926	2,823
100	3,461	3,461	3,399	3,285	3,182
200	3,759	3,759	3,693	3,569	3,452
250	3,856	3,856	3,789	3,663	3,544
300	3,937	3,937	3,869	3,744	3,621
500	4,011	4,011	3,945	3,820	3,698
700	4,025	4,025	3,961	3,836	3,715
850	3,866	3,866	3,802	3,681	3,565
1000	3,231	3,231	3,174	3,072	2,971

Tropics (25S-25N), JUL 03/04, U-Wind, Fcst-Obs Statistics

press(mb)	Bias m/s				
	tau=0hr	tau=12hr	tau=24hr	tau=48hr	tau=72hr
30	0.1	0.8	0.9	0.8	0.9
50	-0.8	-1.4	-1.6	-1.9	-1.9
100	0	-0.3	-0.6	-0.6	-0.8
200	-0.5	-1	-1.3	-1.3	-1.1
250	-0.4	-0.7	-0.9	-0.9	-1.1
300	-0.3	-0.5	-0.6	-0.8	-0.8
500	-0.2	-0.1	0	-0.1	-0.1
700	0	0	0.1	0.2	0.2
850	-0.3	-0.3	-0.4	-0.4	-0.4
1000	-0.6	-0.8	-0.8	-0.9	-0.8

press(mb)	SD m/s				
	tau=0hr	tau=12hr	tau=24hr	tau=48hr	tau=72hr
30	2.9	4.2	4.4	4.7	4.9
50	3	4.4	4.6	5.1	5.3
100	3.1	4.5	4.8	4.9	5.1
200	3	4.5	5.2	6	6.5
250	2.6	3.9	4.5	5.2	5.8
300	2.7	3.6	4	4.5	5
500	2.3	3	3.3	3.7	4
700	2	3	3.3	3.7	4
850	1.9	2.9	3.2	3.6	3.9
1000	1.7	2.6	2.7	2.7	2.9

press(mb)	RMSE m/s				
	tau=0hr	tau=12hr	tau=24hr	tau=48hr	tau=72hr
30	3	4.6	4.9	5.2	5.4
50	3.1	4.6	4.9	5.4	5.6
100	3.1	4.5	4.9	5.1	5.4
200	3.1	4.8	5.6	6.3	6.8
250	2.6	4	4.7	5.4	5.9
300	2.7	3.6	4	4.7	5.2
500	2.3	3	3.3	3.7	4
700	2	3	3.3	3.7	4
850	1.9	3	3.2	3.6	3.9
1000	1.8	2.7	2.8	2.9	3

No. RAOBS

press(mb)	No. RAOBS				
	tau=0hr	tau=12hr	tau=24hr	tau=48hr	tau=72hr
30	3,022	2,992	2,942	2,844	2,752
50	3,389	3,358	3,303	3,199	3,100
100	3,655	3,623	3,564	3,457	3,335
200	4,026	3,990	3,923	3,802	3,673
250	4,081	4,044	3,977	3,854	3,721
300	4,121	4,084	4,017	3,892	3,762
500	4,155	4,118	4,054	3,929	3,795
700	4,158	4,121	4,053	3,924	3,791
850	3,999	3,963	3,899	3,777	3,652
1000	3,347	3,317	3,265	3,159	3,054