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SPACE SCIENCE AND ENGINEERING CENTER

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November 28, 1984

National Aeronautics and Space Administration
Marshall Space Flight Center
Attn: Dr. Michael Kalb, Code ES84
Huntsville, AL 35812

The Schwerdtfeger Library
1225 W. Dayton Street
Madison, WI 53706

Dear Dr. Kalb:

Please find attached the progress report for contract NAS8-34732 through November 1984. Total expenditures through October 1984 are \$94,696.61 out of contract total of \$111,608. If you have any questions, please call Dr. George Diak at 608-263-6762.

John P. Roberts
John P. Roberts
Assistant Director

Attachment

6/MISC3/83

cc: P. Menzel (SSEC)
G. Diak (SSEC)
ONR (Chicago)
Code AP29-H (MSFC)
5800

Progress Report

Through

November 1984

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Cooperative VAS Program

with Marshall Space Flight Center

Contract No. NAS8-34732

Prepared by

Space Science and Engineering Center
University of Wisconsin-Madison
1225 West Dayton Street
Madison, Wisconsin 53706

for

National Aeronautics and Space Administration
Marshall Space Flight Center
Huntsville, Alabama

Modelling

Here, at the beginning of the 1985 continuation of the Marshall VAS cooperative contract, it is appropriate to summarize the past year's modelling work. The highlight of this work has been the amount of information and experience we have obtained using VAS soundings and the subsynoptic scale model and analysis system

Forecasts made to date are as follows:

March 6, 1982

- 1) Control (12-0Z)
- 2) 14:30-0Z with original sounding set
- 3) 14:30-0Z with edited original sounding set
- 4) 17:30-0Z with new (one pass) sounding set
- 5) 17:30-0Z with new soundings and cloud drift winds
- 6) 17:30-0Z with VAS moisture only
- 7) 14:30-0Z applying only VAS height gradients in analysis

April 24, 1982

Control (12-0Z)
14:30-0Z old soundings
17:30-24 old soundings

April 26, 1982

Control (12-0Z)

16-0Z old soundings

17-0Z old soundings

19-0Z old soundings

20-0Z old soundings

16-0Z old soundings and cloud drift winds

17-0Z old soundings and cloud drift winds

18-0Z old soundings and cloud drift winds

20-0Z old soundings and cloud drift winds

It is difficult to summarize here in a few paragraphs the experience of several tens of model runs, and we will be writing a more detailed interim report on the topic. Generally speaking, the modelling effort to date has had a mixed bag of results. Some are very encouraging. The consistency of independent forecasts on April 26 and the value of cloud drift winds in these analyses was a highlight of the past year's work. We have also noted an improvement in the analysis and forecast for 17:30-0 on March 6 with inclusion of the cloud-drift winds. We are now producing a wind set for 14:30 on March 6 to use in the analysis for this time. A recent re-edit of the original sounding set for this day and time has produced a very good forecast. Forecast skill for heights was of similar quality to the control, with some improvement noted in precipitation patterns.

Forecasts for April 24th have been somewhat frustrating. It is evident in the VAS data set that the horizontal gradients are well depicted

by the data, but data biases exist which are evidenced in the analyses and forecasts produced for this day.

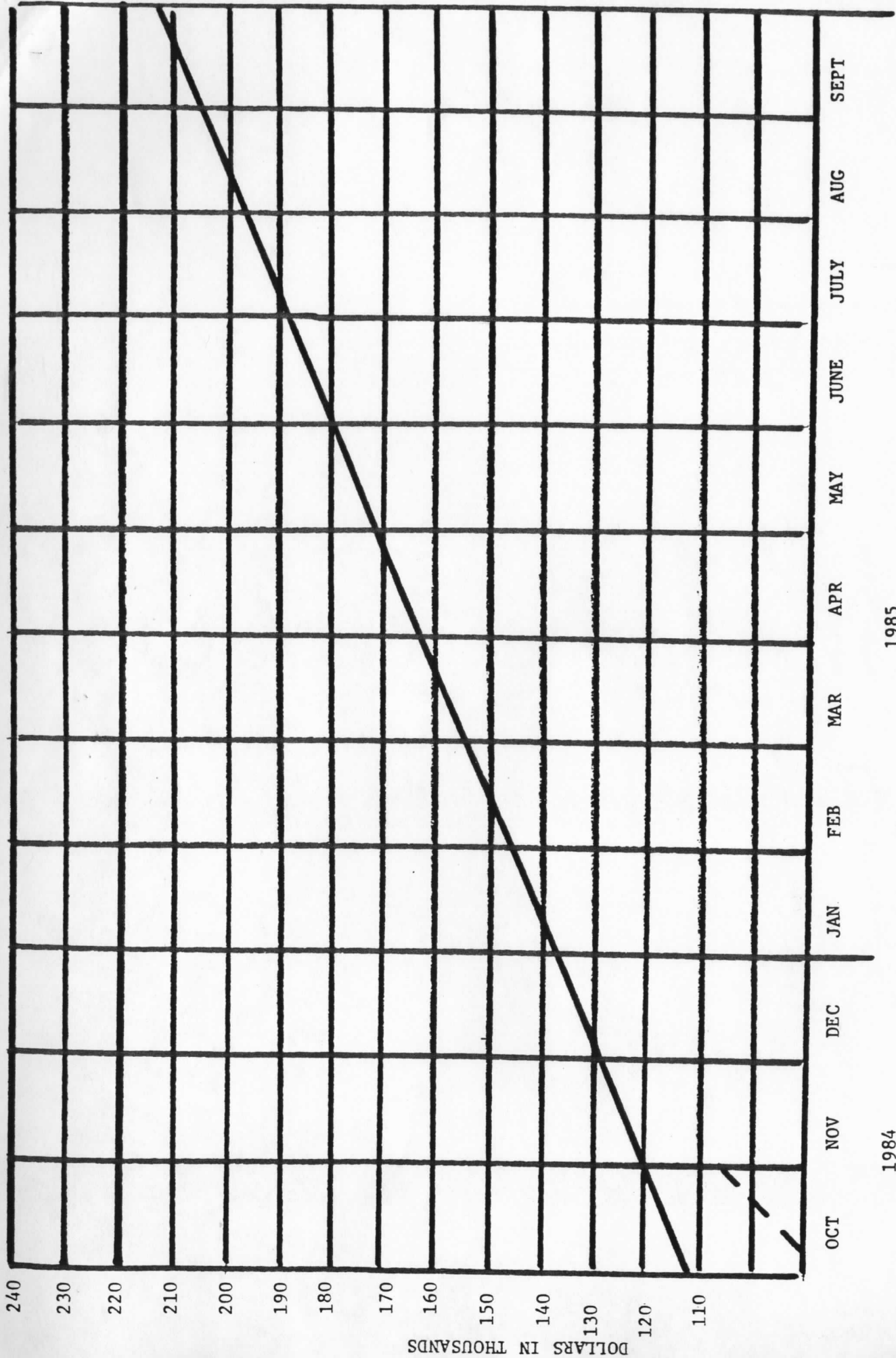
This problem of biases is the most severe limitation on use of the VAS data in numerical prediction, and efforts to remove it, both at the data and analysis end, will constitute much of this year's emphasis. We have already experimented in one 14:30 March 6 Analysis-Forecast in applying only the gradients of the VAS heights, in a variational procedure, to produce the final height analysis. We were encouraged that the analysis made with this procedure was the best of any made using satellite data for this time, as was the corresponding height forecast.

A second major goal for the forthcoming year is to begin work which will allow quasi-continuous ingestion of VAS information into our analysis. Dr. John McGregor from the Australian Numerical Meteorological Research Center has recently implemented a normal mode initialization scheme into our prognosis system. This technique has been demonstrated successfully in lessening model shock after initialization, and we will be running experiments to determine its value in data assimilation.

MAMS

On August 28-29, 1984, P. Menzel and G. Wilson toured the NASA Ames ERT-Test Flight Facility in preparation for the MAMS engineering checkout flights scheduled for January 1985. A milestone schedule was drafted that includes eight science flights out of Topeka, Kansas. The preflight calibration procedure is being outlined.

PROJECTED AND ACTUAL EXPENDITURES



PROJECTED
ACTUAL

TASK	YEAR		1984												
	MONTH		A	S	O	N	D	J	F	M	A	M	J	J	
MODELLING	SSM		SSSSSSSS	SSSSSSSS	SSSSSSSS	SSSSSSSS	SSSSSSSS	SSSSSSSS	SSSSSSSS	SSSSSSSS	SSSSSSSS	SSSSSSSS	SSSSSSSS	SSSSSSSS	SSSSSSSS
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TASK	YEAR		1984												
	MONTH		A	S	O	N	D	J	F	M	A	M	J	J	
Technique development			SSSSSS	SSSSSS	SSSSSS	SSSSSS	SSSSSS	SSSSSS	SSSSSS	SSSSSS	SSSSSS	SSSSSS	SSSSSS	SSSSSS	SSSSSS
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Technique integration									SSSSSS	SSSSSS	SSSSSS	SSSSSS	SSSSSS	SSSSSS	SSSSSS
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Cloud height/wind