EASTERN REGION TECHNICAL ATTACHMENT
No. 76-20
September 13, 1976

VERIFICATION OF FLASH FLOOD WATCHES IN THE EASTERN REGION - PART II

In Technical Attachment No. 76-17, we presented performance statistics for our flash flood watches based upon varying forecast lead times (time of observation minus issuance time of forecast). Once the concept of lead time is introduced, the questions and answers about forecast performance are not as straightforward as they would be without this additional factor. Here are two valid questions that can be posed and answered:

1. What is the performance of our flash flood watches for various lead times?

2. What is the performance of our flash flood program given various lead times for our flash flood watches?

The problem will be demonstrated by using the following contingency table:

	Flash Floods: Watch	Flash Floods: No Watch
Observed	a	b
Not Observed	c	

The numbers "a, b and c" are used to compute all of the performance statistics we normally examine. The concept of lead time has meaning only when applied to number "a" - watch issued and flash flood observed. The assumption can be made that number "c" represents watches with an infinite lead time (watches that did not verify). We chose to make that assumption in this and the previous Attachment. There is still the problem of how to handle number "a" and this is the crux of the difference between the results presented in both Attachments. Question 1., above, was answered in the previous Attachment and flash flood watch/observed data pairs were dropped from the sample if the lead time was less than that specified for the results. In the results presented here in Table 1, flash flood watch/observed data pairs, with a lead time less than that specified, are shifted from number "a" to number "b", i.e., from watch issued and flash flood observed to watch not issued but flash flood observed. To clarify, if a flash flood watch had a lead time of 2 hours, but the results are for lead times of $\geq$ hours, this data pair is counted as a watch not issued but a flash flood observed.

The following results answer question 2., above. They are based on data from Eastern Region WSFOs for the period December 1971 - January 1974, just as in the previous attachment:

Winter (October - March)

Lead Time	P.F.*	P.A.*	T.S.*	Bias
≥0 hours	0.883	0.379	0.361	2.33 $\frac{140}{60}$
≥3 hours	0.317	0.179	0.129	1.77 $\frac{106}{60}$
≥6 hours	0.150	0.094	0.061	1.60 $\frac{96}{60}$

Summer (April - September)

Lead Time	P.F.*	P.A.*	T.S.*	Bias
≥0 hours	0.696	0.440	0.369	1.58 $\frac{109}{69}$
≥3 hours	0.290	0.247	0.154	1.17 $\frac{81}{69}$
≥6 hours	0.159	0.153	0.085	1.04 $\frac{72}{69}$

*P.F. = prefigurance
P.A. = post agreement
T.S. = threat score

Table 1. Verification of flash flood watches for all Eastern Region WSFOs combined.

As might be expected, these results show a poorer performance than those of the previous Attachment. The reason is quite simple. Here, we have retained the data which is counted as a "miss" because of the lead time criteria. However, the bias improves because the data, retained, increases the number of observations. The post agreement remains the same since the data that goes into its computation has not been affected.# Both sets of results show the same relative differences between summer and winter. In winter we generally catch more flash flood occurrences by overforecasting the event. The post agreement is better in the summertime because there is less overforecasting.

Which set of results should we use in discussions of flash flood forecast performance? We think that the results presented here are more useful because the question being answered is more general in scope.

#Two minor computational errors were found in the post agreements for the original set of results. The post agreements presented here are the correct ones for both sets of results.

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