

Verification of Flash Warnings of Severe Weather at the UK Met Office

Dr. Michael Sharpe

Verification of Flash Warnings



⚡ Flash warnings are issued on a regional/county/unitary authority basis for :

- ⚡ severe gales
- ⚡ heavy rain
- ⚡ dense fog
- ⚡ heavy snow
- ⚡ blizzards/drifts
- ⚡ freezing rain, glazed frost or widespread icy roads

⚡ Flash warnings :

- ⚡ are verified for severe gales and heavy rain
- ⚡ have been routinely verified since January 2003
- ⚡ are verified separately against observations and Nimrod analysis fields
- ⚡ are verified for 65 different regions which broadly correspond to counties

Verification of Flash Warnings



⚡ Many counties have only a single observing site (several have no site)

⚡ verification against Nimrod fields is preferred

⚡ Verification for each warning is against the threshold for the event

⚡ ≥ 70 mph for wind gusts

⚡ 15mm/3hr for rainfall

	Time severe weather observed	Result
Flash Wind Warnings (gust ≥ 70mph)	Severe weather occurred within time window of warning	Hit
	No severe weather occurred within time window of warning	False Alarm
Flash Rain Warnings (3hr precip ≥ 15mm)	Severe weather occurred when no warning was in force	Miss

Verification of Flash Warnings



$$\text{Hit Rate} = \frac{\text{Number of Hits}}{\text{Number of Hits} + \text{Number of Misses}}$$

Answers: **‘What fraction of the observed events were correctly forecast?’**
The hit rate has a range of 0 to the perfect score of 1

$$\text{False Alarm Ratio} = \frac{\text{Number of False Alarms}}{\text{Number of Hits} + \text{Number of False Alarms}}$$

Answers: **‘What fraction of the forecast events were incorrectly forecast?’**
The false alarm rate has a range of 1 to a perfect score of 0

$$\text{Threat Score} = \frac{\text{Number of Hits}}{\text{Number of Hits} + \text{Number of False Alarms} + \text{Number of Misses}}$$

Answers:
‘What fraction of the forecast and observed events were correctly forecast?’

The threat score has a range of 0 to a perfect score of 1.