WEATHER CLIMATE WATER
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FFGS Verification Studies

WMO OMM

World Meteorological Organization
Organisation météorologique mondiale

Probability of Detection

$$P_0D = HR = \frac{a}{a + c}$$

The hit rate (HR) has a range of 0 to 1 with 1 representing a perfect forecast. As it uses only the observed events a and c in the contingency table, it is sensitive only to missed events and not false alarms.

The HR is incomplete by itself and should be used in conjunction with either the false alarm ratio or the false alarm rate.

a = hits
b = false alarms
c = misses

False Alarm Ratio

$$FAR = \frac{b}{a + b}$$

The false alarm ratio (FAR) is the ratio of the total false alarms (b) to the total events forecast (a + b).

Its range is 0 to 1 and a perfect score is 0. It does not include c and therefore is not sensitive to missed events.

The FAR can be improved by systematically under-forecasting rare events. It also is an incomplete score and should be used in connection with the HR.

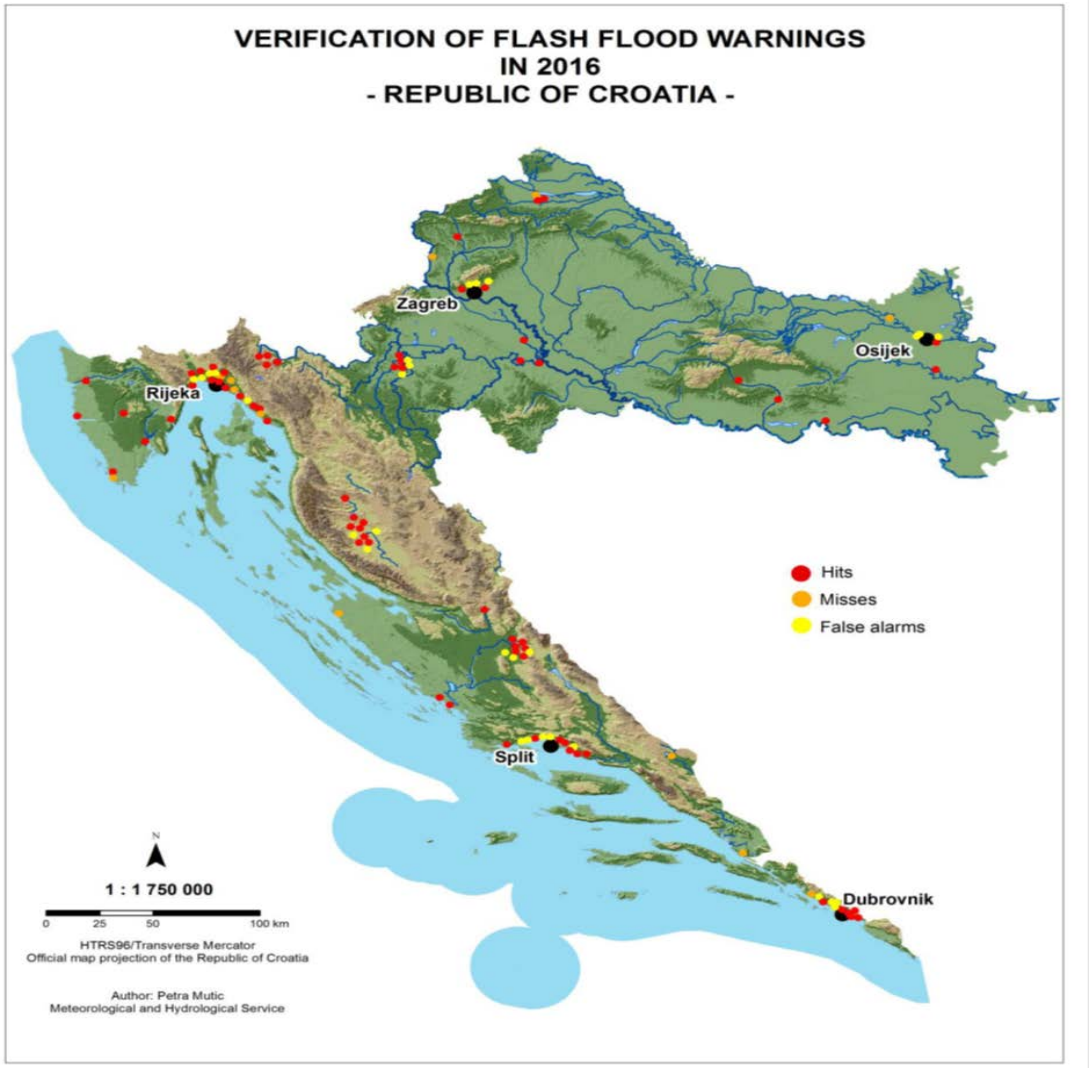
False Alarm Rate of Probability of False Detection (POFD)

$$POFD = \frac{b}{b + d}$$

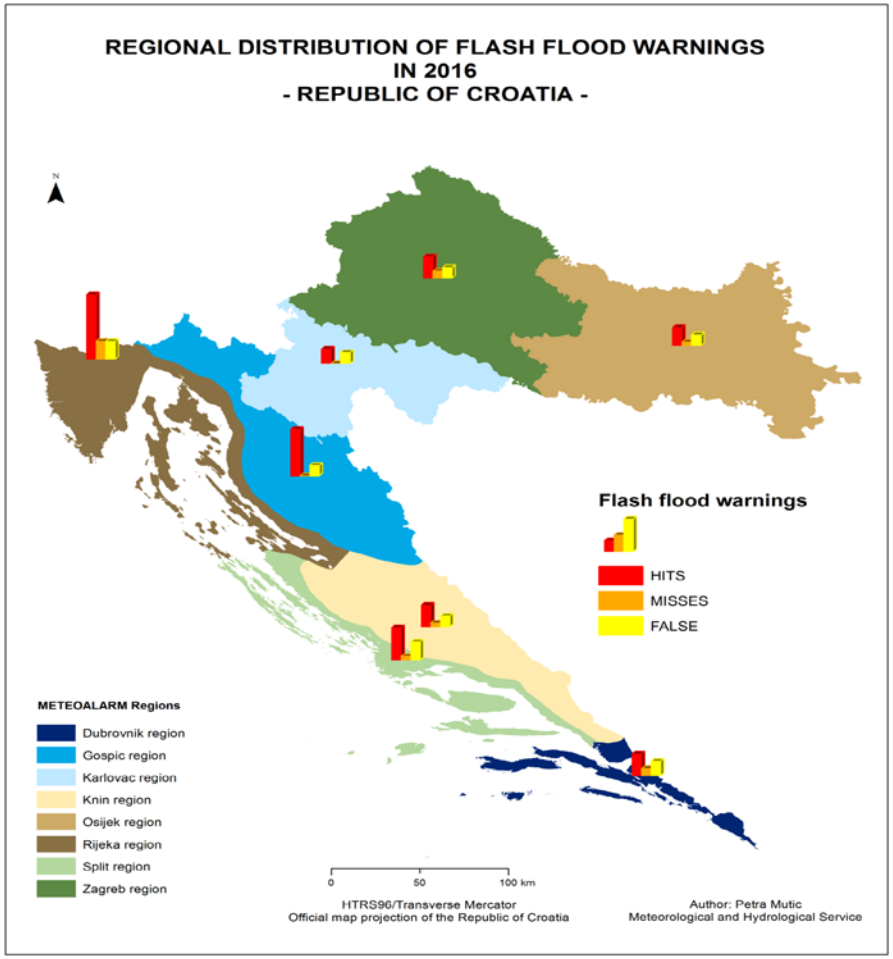
The Probability of false Detections is the ratio of the total false alarms (b) to the total “no events” forecasted (b + d)., where d is the correct negatives.

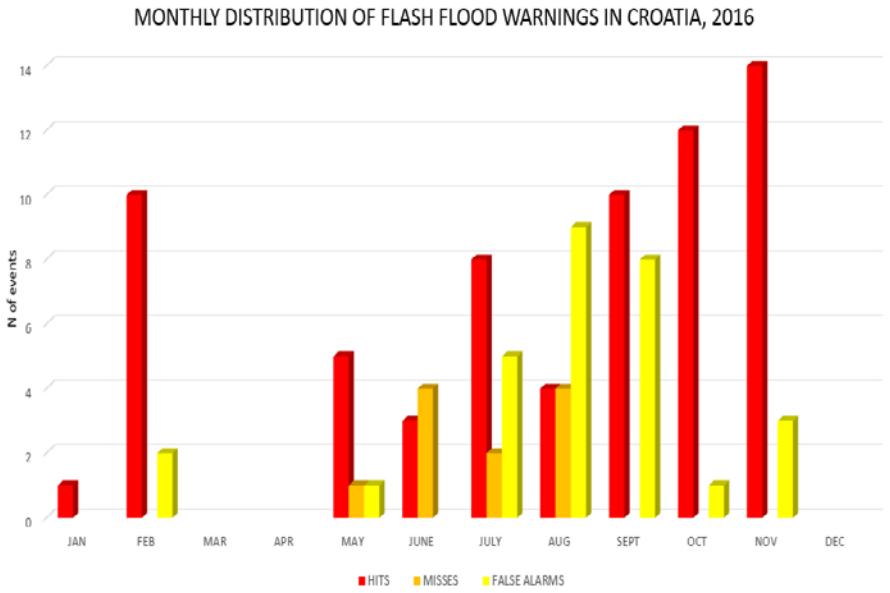
Its range is 0 to 1 and a perfect score is 0. It does not include a or c, and therefore it is not sensitive to hits or missed events.

Verification of FF Warnings in Croatia



Verification of FF Warnings in Croatia





Verification of FF Warnings in Croatia

a = Hits
b = False alarms
c = Misses
d = Correct negatives

		EVENT OBSERVED		
		Yes	No	Total
EVENT FORECASTED	Yes	67 (a)	29 (b)	96
	No	12 (c)	2528 (d)	2540
	Total	79	2557	2636

Contingency table of flash flood warnings for Croatia in 2016

Prepared by: Petra Mutic, Meteorological

Hit Rate (POD) : a/ (a + c)	**0.84**
False Alarm Ratio (FAR): b/ (a + b)	0.30
False Alarm Rate (POFD): b/ (b + d)	0.01
Threat Score: a/ (a + b + c)	**0.62**

The scores of flash flood warnings for Croatia in 2016

Prepared by: Petra Mutic, Meteorological and Hydrological Service

Note: POFD is the Probability of False Detection.

Verification of FF Warnings in Croatia

a = Hits
b = False alarms
c = Misses
d = Correct negatives

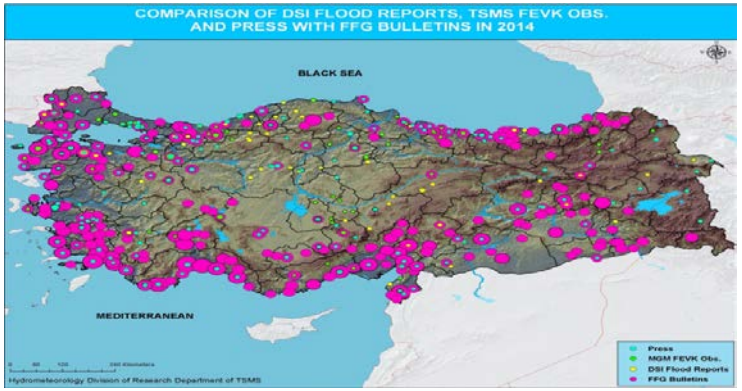
		EVENT OBSERVED		
		Yes	No	Total
EVENT FORECASTED	Yes	21 (a)	7 (b)	28
	No	1 (c)	113 (d)	114
	Total	22	120	142

Contingency table of flash flood warnings for Croatia

in the period from 10th of October 2015 to 29th of February 2016

Hit Rate (POD): a/(a+c)	0.75
False Alarm Ratio (FAR): b/(a+b)	0.045
False Alarm Rate (POFD): b/(b+d)	0.009
Threat Score: a/(a+b+c)	0.72

Verification of FF Warnings in Turkey



Bulletins (21 May 2012-17 June 2013)	Observations (TSMS, DSİ, Press)			
		YES	NO	Σ
	YES	43 (a)	25 (b)	68
	NO	18 (c)	306 (d)	324
	Σ	61	331	392

Hit Rate (POD): (a/(a+c))	0.70
False Alarm Ratio (FAR): (b/(a+b))	0.36
False Alarm Rate (POFD): b/(b+d)	0.07
Threat Score: (a/(a+b+c))	0.5

Bulletins 2014	Observations (TSMS, DSİ, Press)			
		YES	NO	Σ
	YES	58(a)	10 (b)	68
	NO	48 (c) (DSİ+MGM+Basin)	249 (d)	297
	Σ	106	259	365

Hit Rate (POD): (a/(a+c))	0.55
False Alarm Rate (FAR): (b/(a+b))	0.15
False Alarm Rate (POFD): b/(b+d)	0.04
Threat Score: (a/(a+b+c))	0.5

Thank you

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