



HRVATSKA KONTROLA
ZRAČNE PLOVIDBE

Results of the Thunderstorm Forecast Verification in Terminal Aerodrome Forecasts in Croatia

Jadran Jurković
Igor Kos

Challenges in meteorology 3
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■ Outline

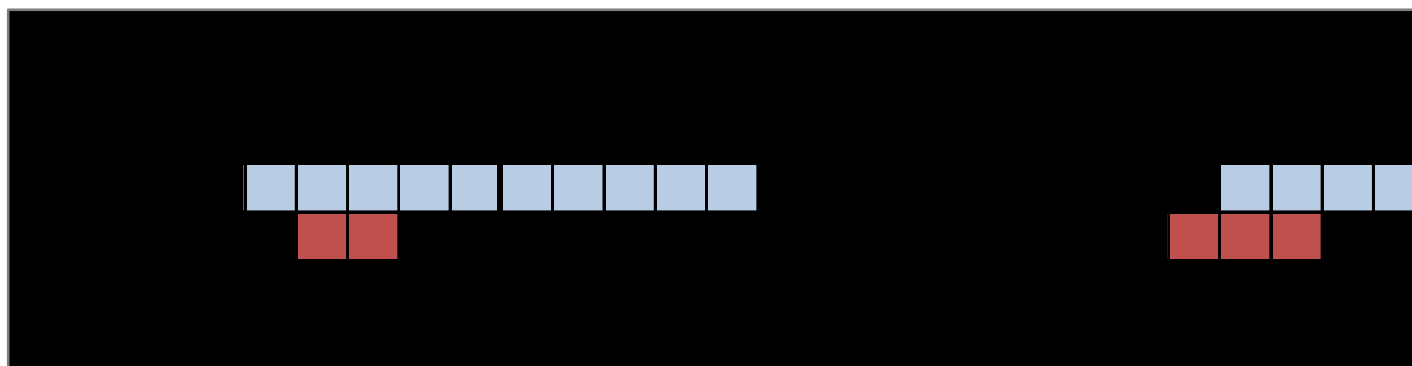
- Introduction
- Method and data
- Results and discussion
- Conclusion

■ Introduction

- Forecasts Improvement
 - Understand correct, miss, false alarm events
 - Verification of special problems
 - Convection (TS)
 - Fog (reduced visibility)
 - Wind (especially bora events)
- Thunderstorm (TS)
 - Mesoscale phenomenon (deep and moist convection)
 - Month with max. frequency of days with TS has 12-25%
 - Impact on aviation
- Part of Quality management system (ICAO Annex 3)

Method and data

- Forecasts for 6 airport in Croatia
 - Inland: Zagreb (LDZA), Osijek (LDOS)
 - Onshore: Pula (LDPL), Zadar (LDZD), Split (LDSP), Dubrovnik (LDDU)
- Period 2009-2012
- ~750,000 forecasted hours (events)
- Contingency tables for each airport
- Method similar to Austrocontrol's Mahringer (2008)



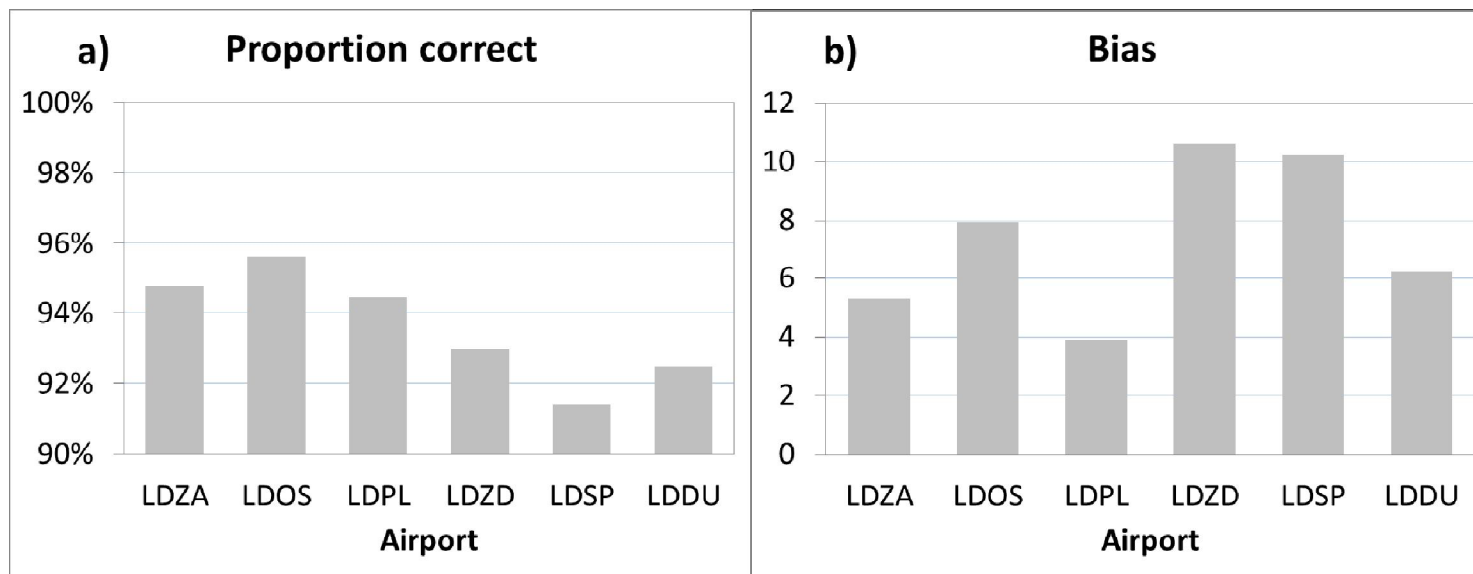
■ Results (1)

- Proportion correct (PC)

$$PC = \frac{a + d}{n} = \frac{\text{correct}}{\text{total}}$$

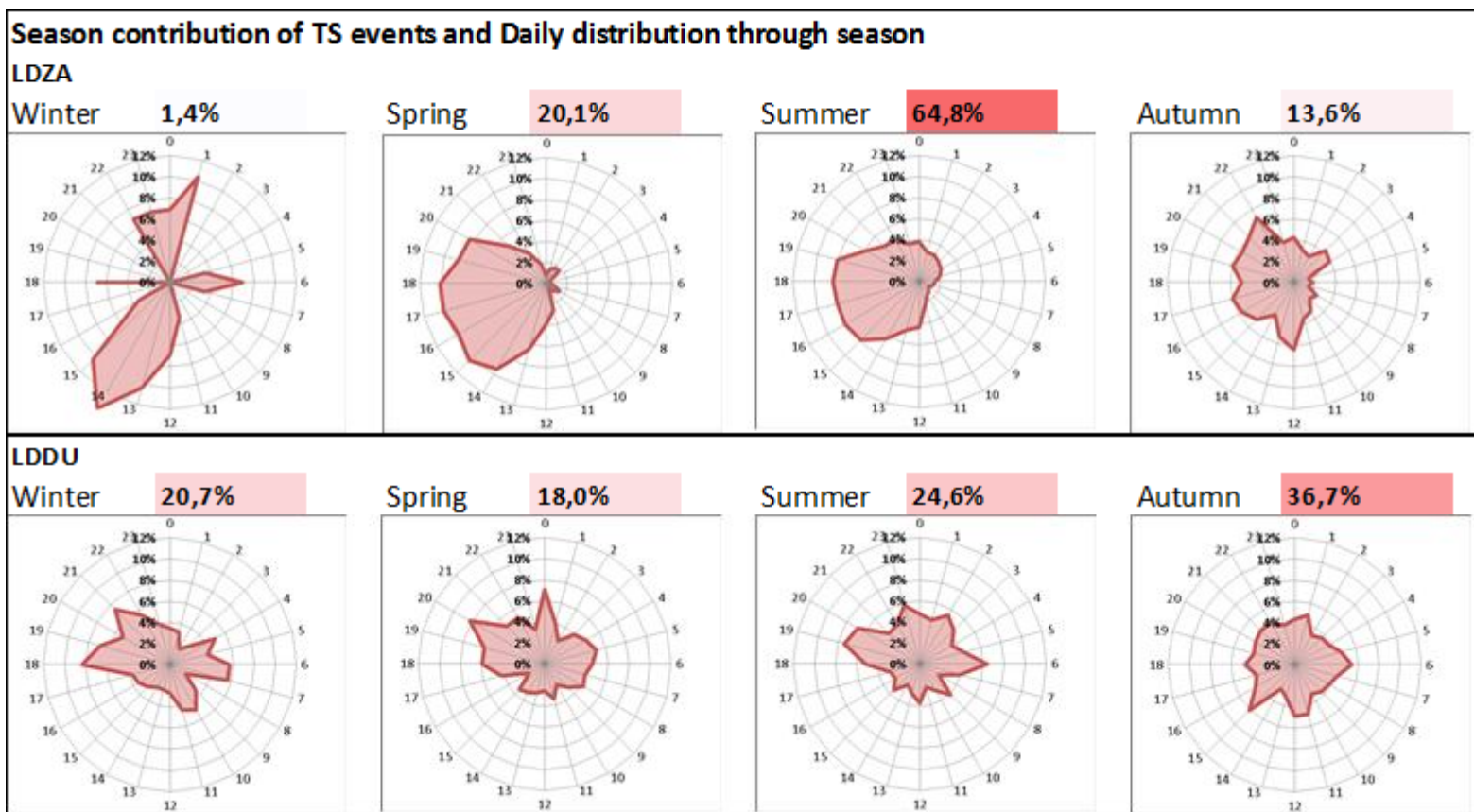
- Bias

$$\text{Bias} = \frac{a + b}{a + c} = \frac{\text{forecasted}}{\text{observed}}$$



Results (2)

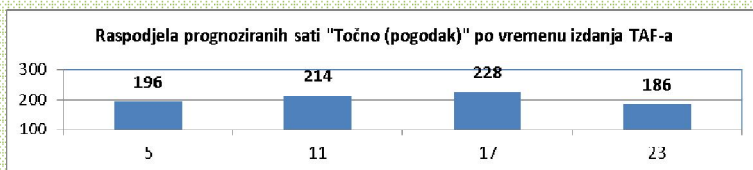
- PC - better for inland airports and LDPL
 - Climatology,
 - Frequency of hours with TS ~1-1.5%



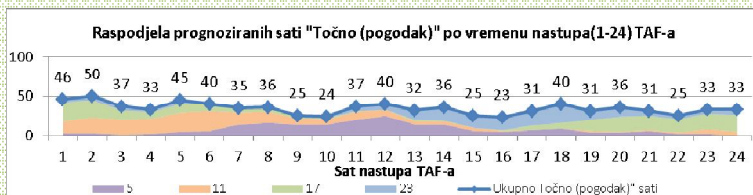
Results (3) detailed analysis (a=hit)

LDZA

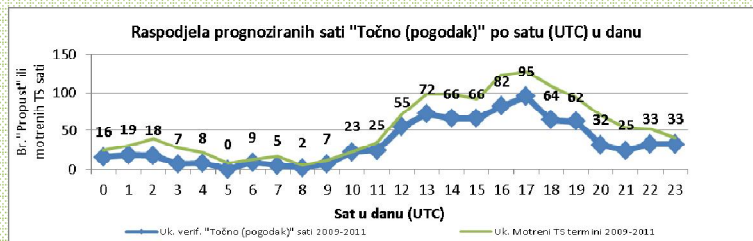
- Issue time (UTC)



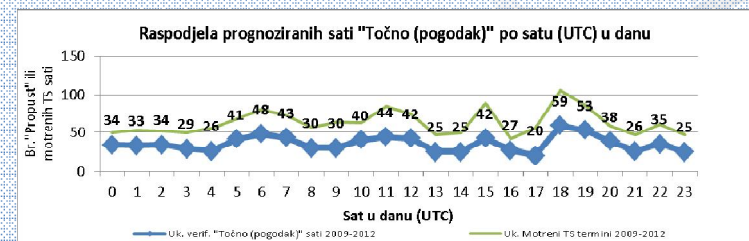
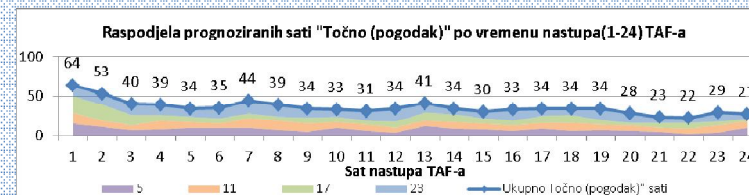
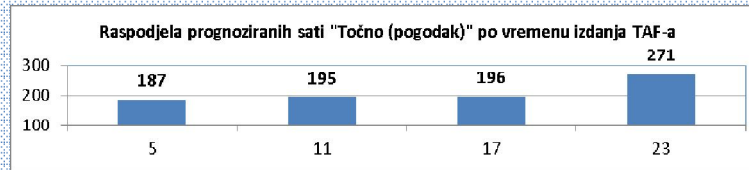
- Lead time



- Day



LDDU



■ Conclusion

- PC and bias results
- Basic verification results depends on
 - Climatology
 - Lead time, issue time, forecasting office
- Less bias at inland airports due to pronounced daily and yearly maxima
- Better scores when forecast TS period is shorter
- Results suggest need of better forecast