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

Jadran Jurković
Igor Kos
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 airports 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 Austroicontrol’s Mahringer (2008)
Results (1)

- Proportion correct (PC)

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

- Bias

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

---

### a) Proportion correct

<table>
<thead>
<tr>
<th>Airport</th>
<th>LDZA</th>
<th>LDOS</th>
<th>LDPL</th>
<th>LDZD</th>
<th>LDSP</th>
<th>LDDU</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>90</td>
<td>94</td>
<td>92</td>
<td>92</td>
<td>96</td>
<td>98</td>
</tr>
</tbody>
</table>

### b) Bias

<table>
<thead>
<tr>
<th>Airport</th>
<th>LDZA</th>
<th>LDOS</th>
<th>LDPL</th>
<th>LDZD</th>
<th>LDSP</th>
<th>LDDU</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>10</td>
<td>12</td>
<td>10</td>
</tr>
</tbody>
</table>
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
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