Project 3: Spatial verification of precipitation over the Alps during MesoVICT-I

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#### **Observations**:

- Vienna Enhanced Resolution Analysis (VERA)
- Interpolation of observations to a regular grid in mountainous terrain

## Models:

- Swiss COSMO-2 model
- Canadian Meteorological Centre CMCGEMH (outdated version)



## Methods (I): Fraction Skill Score

Answers the question

"What are the spatial scales at which the forecast resembles the observations?"

- How forecast skill varies with neighbourhood size
- The smallest neighbourhood size that can be used to give sufficiently accurate forecasts
- Do higher resolution NWP provide more accurate forecasts on scales of interest



CAWR.gov.au/projects/verification

### Methods (II): Contiguous Rain Areas (CRA)

Answers the question

"What is the location error of the (spatial) forecast, and how does the total error break down into components due to incorrect location, volume, and fine scale structure?"



Users choose

- threshold to define objects [1mm/h], and
- pattern-matching function [R-verification package default]

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### Summer convective situation in the northern Alpine in August 2007



mesoVICT whitepaper

#### 19 UTC 07/08/2017 Lead: 13 hours



Field resolution: 8 km

#### 19 UTC 07/08/2017 Lead: 13 hours

0.0

0.2

0.4

0.6

0.8



Error Displacement 61 % -8 % Volume 0% 1 % Pattern 40% 107 % 25

20

15

10

Dominant components of the errors are displacement and pattern errors

0.4

0.6

0.8

0.2

0.0

0.0

0.2

1.0

#### 10 UTC 08/08/2017 Lead: 4 hours

**OBSERVATIONS** 



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Dominant components of the errors are displacement and pattern errors

#### 14 UTC 08/08/2017 Lead: 8 hours



#### 14 UTC 08/08/2017 Lead: 8 hours





Dominant components of the errors are displacement and pattern errors

# Conclusions

• Applying several forecast verification metric is recommended !

## FSS

- Showed how skill varies with neighborhood size
- Varying skill for different rainfall thresholds and over time

## CRA

- Strength: error decomposed into
  - Displacement
  - Volume
  - Pattern
- Weakness: pattern matching function and threshold must be *carefully* chosen
  - default might not suffice



