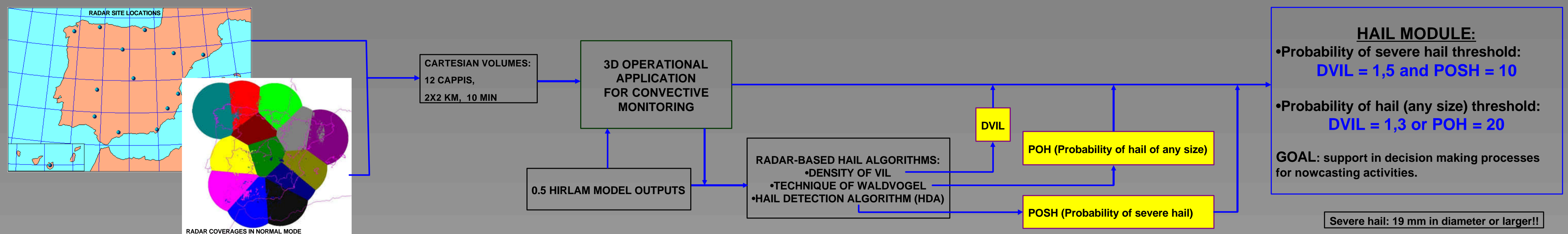


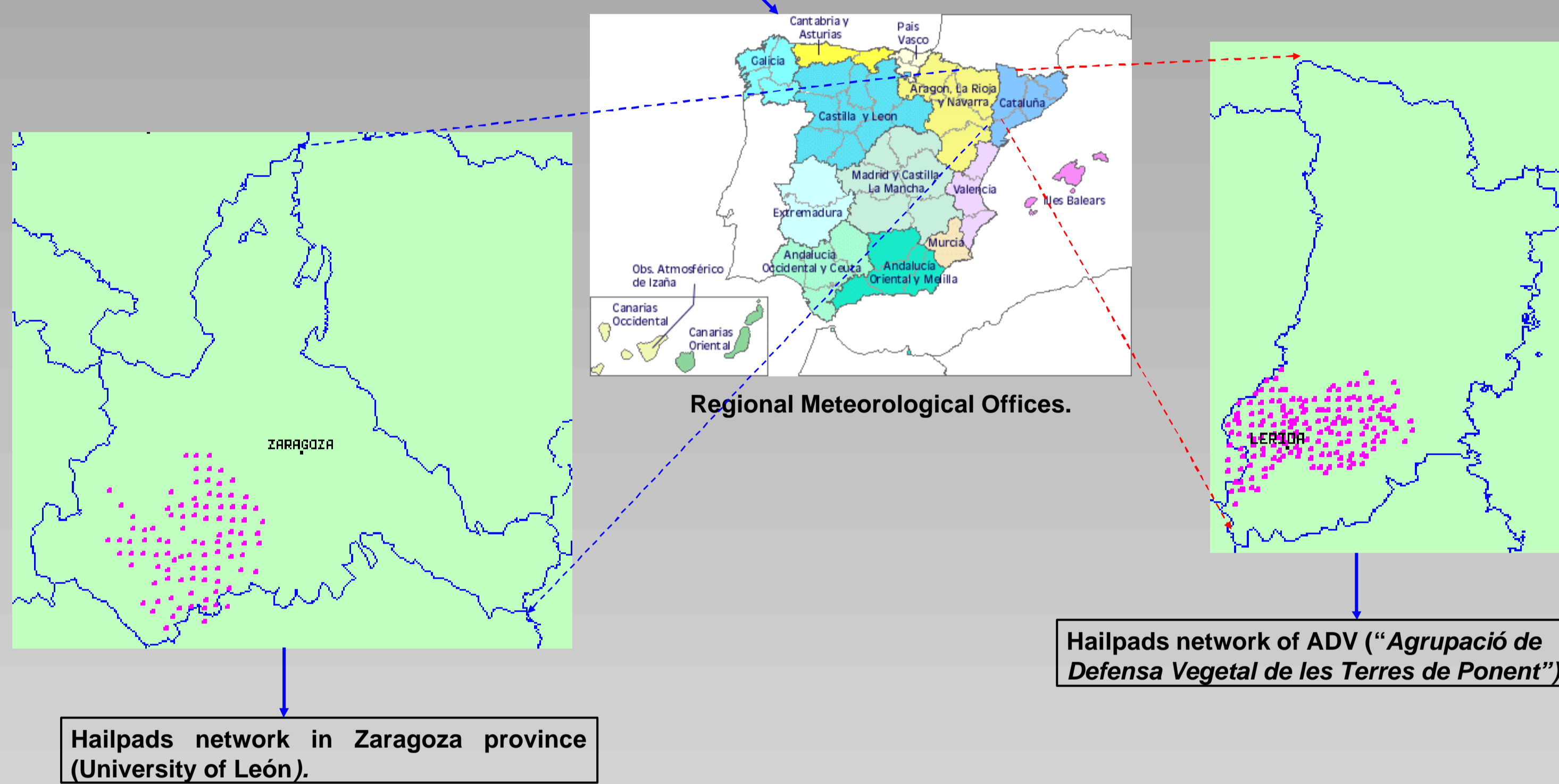
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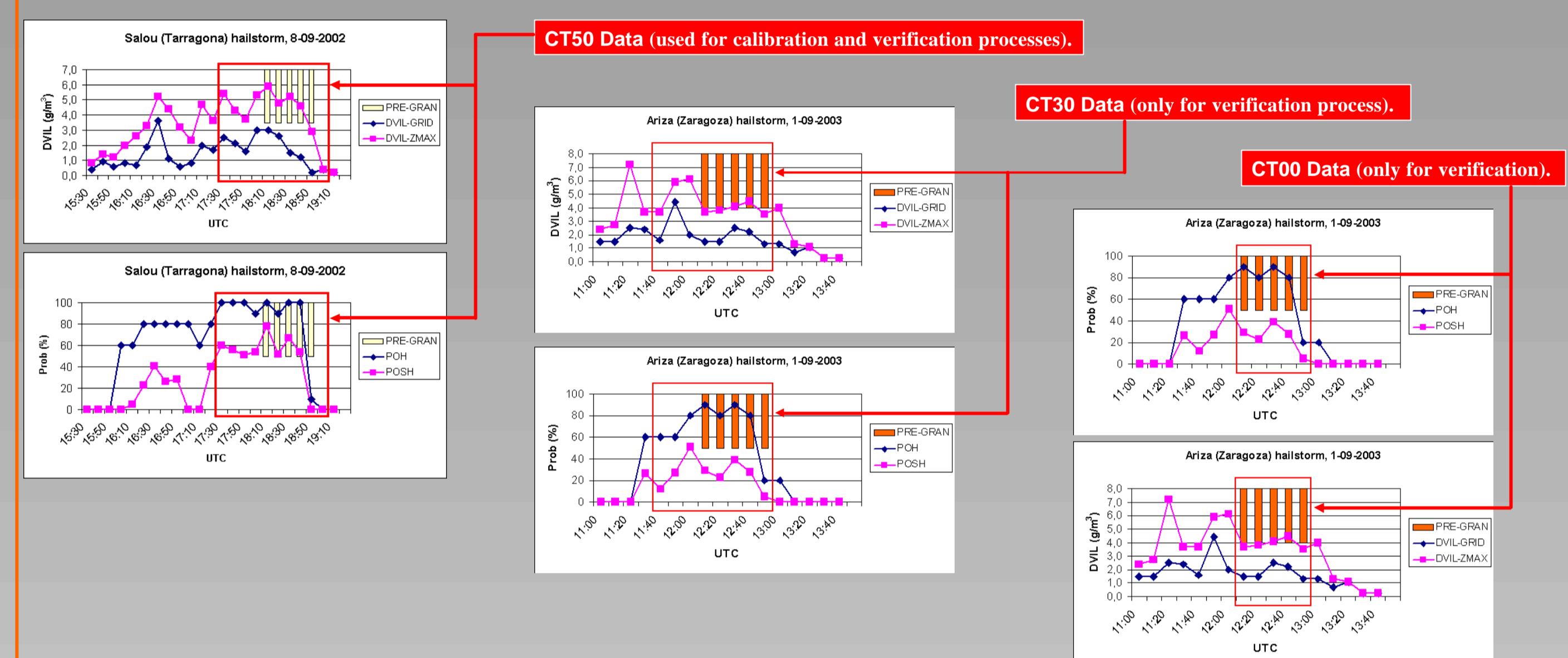
### HAIL DATA COLLECTION

- Information about hailstorms. Years 2001-2002 (calibration), 2003-2004 (verification):
  - Place and time of the hailfalls.
  - Hail size (severe or non severe).
- Information sources:
  - Press, radio, TV, internet, checked by CMTs (Regional Meteorological Offices).
  - 97 hailpads network in Zaragoza province, (Atmospheric Research Group, University of León).
  - Events summaries of ADV (170 hailpads in Lleida province).
- Thunderstorms without hail, based on hailpads data (ADV and University of León).



### METHODOLOGY OF VERIFICATION

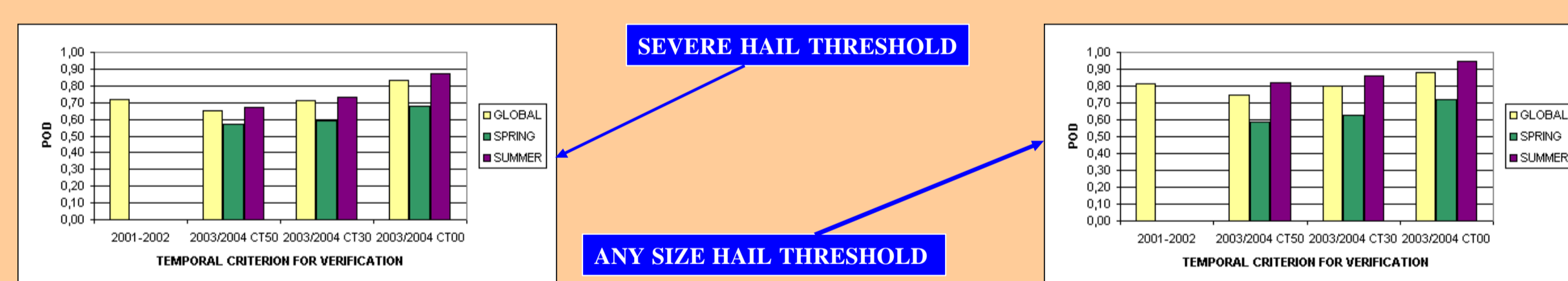
- Three Criteria for Temporal selection, CT50, CT30 and CT00, to analyze the performance of the selected parameters (DVIL, POH and POSH):



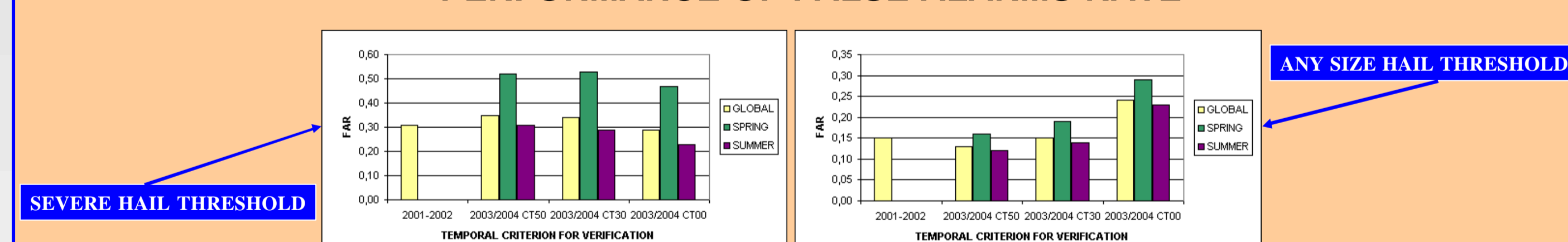
- These three Criteria (CT50, CT30, CT00) have been applied to:
  - GLOBAL PERFORMANCE OF OPERATIONAL THRESHOLDS (MARCH TO SEPTEMBER).
  - SPRING THUNDERSTORMS PERFORMANCE (MARCH TO JUNE).
  - SUMMER THUNDERSTORMS PERFORMANCE (JULY TO SEPTEMBER).
  - MONTHLY PERFORMANCE OF THE THRESHOLDS (ONLY CT50).
- In these periods, and with the three temporal criteria, we have assessed:
  - OPERATIONAL THRESHOLDS VERIFICATION (contingency tables and skill measures).

### THRESHOLDS SEASONAL VERIFICATION

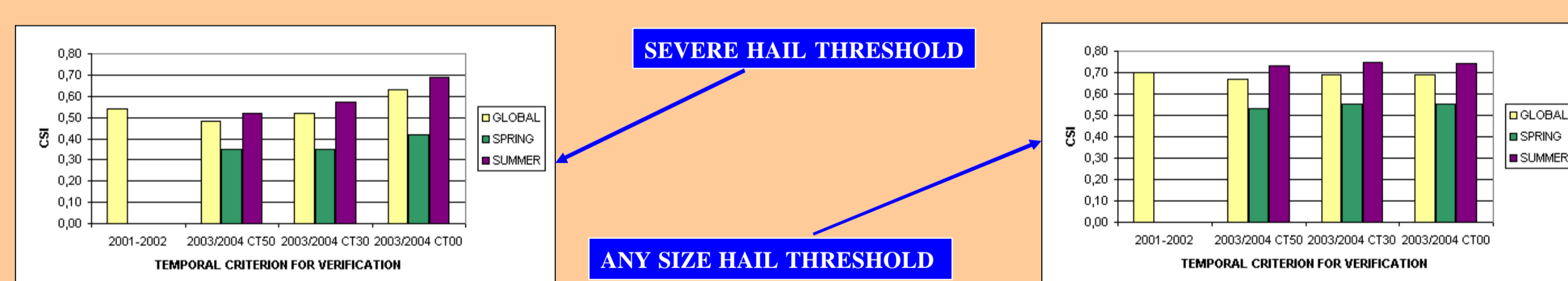
- (compared with 2001-2002 calibration process skill measures)
- PERFORMANCE OF PROBABILITY OF DETECTION



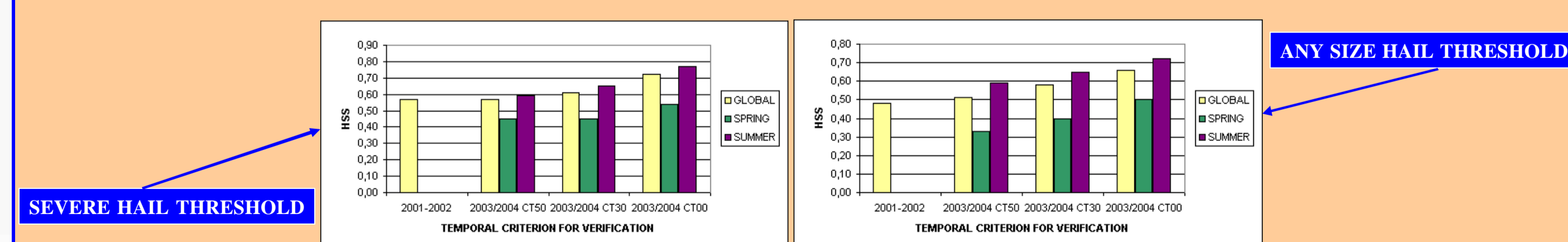
### PERFORMANCE OF FALSE ALARMS RATE



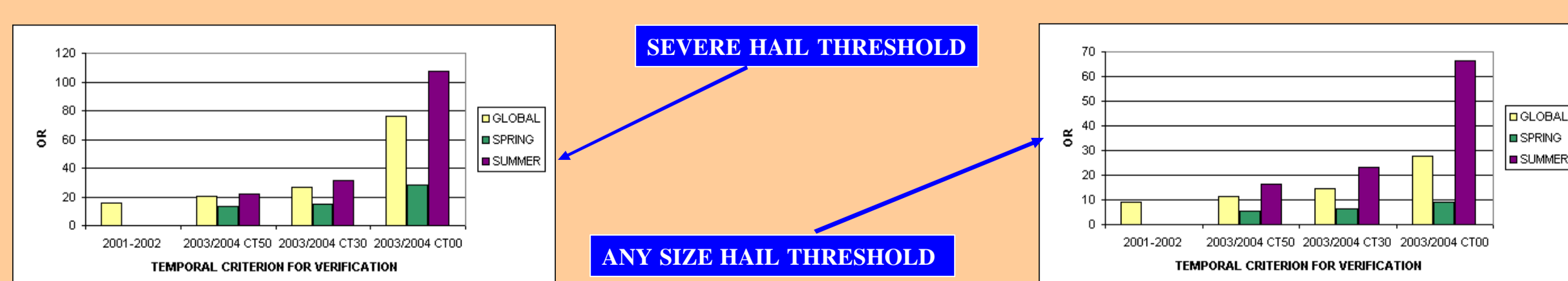
### PERFORMANCE OF CRITICAL SUCCESS INDEX



### PERFORMANCE OF HEIDKE SKILL SCORE



### PERFORMANCE OF ODDS RATIO



### THRESHOLDS MONTHLY VERIFICATION

- (compared with 2001-2002 calibration process skill measures)



### SOME CONCLUSIONS

- An operational Hail Module has been developed. It combines DVIL and HDA to detect severe hail, and DVIL and Technique of Waldvogel for hail of any size.
- Global verification results are quite good, but performance is better for Summer than for Spring hailstorms, and for shorter Temporal Criteria (CT30 and CT00 better than CT50).
- It seems necessary to improve the module to get specific thresholds for each season or month, working with Criteria for Temporal selection such as CT30 or CT20.
- In the near future, two thresholds for severe hailstorms (one for March-June, and other for July-September) will be tuned.
- For any size hail, three thresholds could be necessary, one for March-May, other for June, and the last one for July-September.