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# **MRF - Based MOS Total Cloud Guidance**

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# MRF Cloud Guidance

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- ▶ Mean total cloud amount over a 12-hr Period
- ▶ 3 category system
- ▶ Forecasts valid every 12 hours from 24-192 hours after 00 UTC MRF model run
- ▶ 1,060 sites in the CONUS/AK/HI/PR

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# Predictand Definition

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- ▶ ASOS observations are complimented with the GOES Satellite Cloud Product for clouds  $> 12,000$  ft
- ▶ At least 7 of 13 possible cloud observations are required
- ▶ Each ob is multiplied by a weight factor:
  - ▶ CLR = 0.0
  - ▶ FEW = 0.15
  - ▶ SCT = 0.38
  - ▶ BKN = 0.69
  - ▶ OVC = 1.0
- ▶ First and last ob receive half the weight
- ▶ Mean 12-hr cloud amount is obtained

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## Cloud Category Definitions

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- ▶ CL (mostly clear)
  - ▶  $\leq 0.3125$  mean total cloud cover
- ▶ PC (partly cloudy)
  - ▶  $0.3125 > \text{mean total cloud cover} < 0.6875$
- ▶ OV (mostly cloudy)
  - ▶  $\geq 0.6875$  mean total cloud cover

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# Developmental Strategy

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- ▶ Develop probabilistic equations using multiple linear regression
- ▶ Make “best category” forecasts with the use of thresholds
- ▶ Thresholds applied cumulatively from below (CL first, then PC, and finally OV)

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# Key Predictors

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## Model Predictors

- ▶ Layered mean RH
- ▶ Model precipitation
- ▶ Stability parameters
- ▶ Constant pressure u-, v-, and wind speed
- ▶ Vertical Velocity
- ▶  $RH * W$

## Geoclimatic Predictors

- ▶ Relative frequencies
- ▶  $\text{Sin}(\text{DOY}) \text{ Cos}(\text{DOY})$

## Observations

- ▶ 6Z Uncomplimented cloud ob (24-hr only)

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# Developmental Sample

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- ▶ 765 stations with “reliable” cloud observations
  - ▶ Divided into 30 regions
- ▶ 3 years of MRF forecast model data
  - ▶ Cool season (October - March) 1997-98, 1998-99, 1999-2000

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## **Cool Season Regions**

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- ▶ Regional map coming soon!



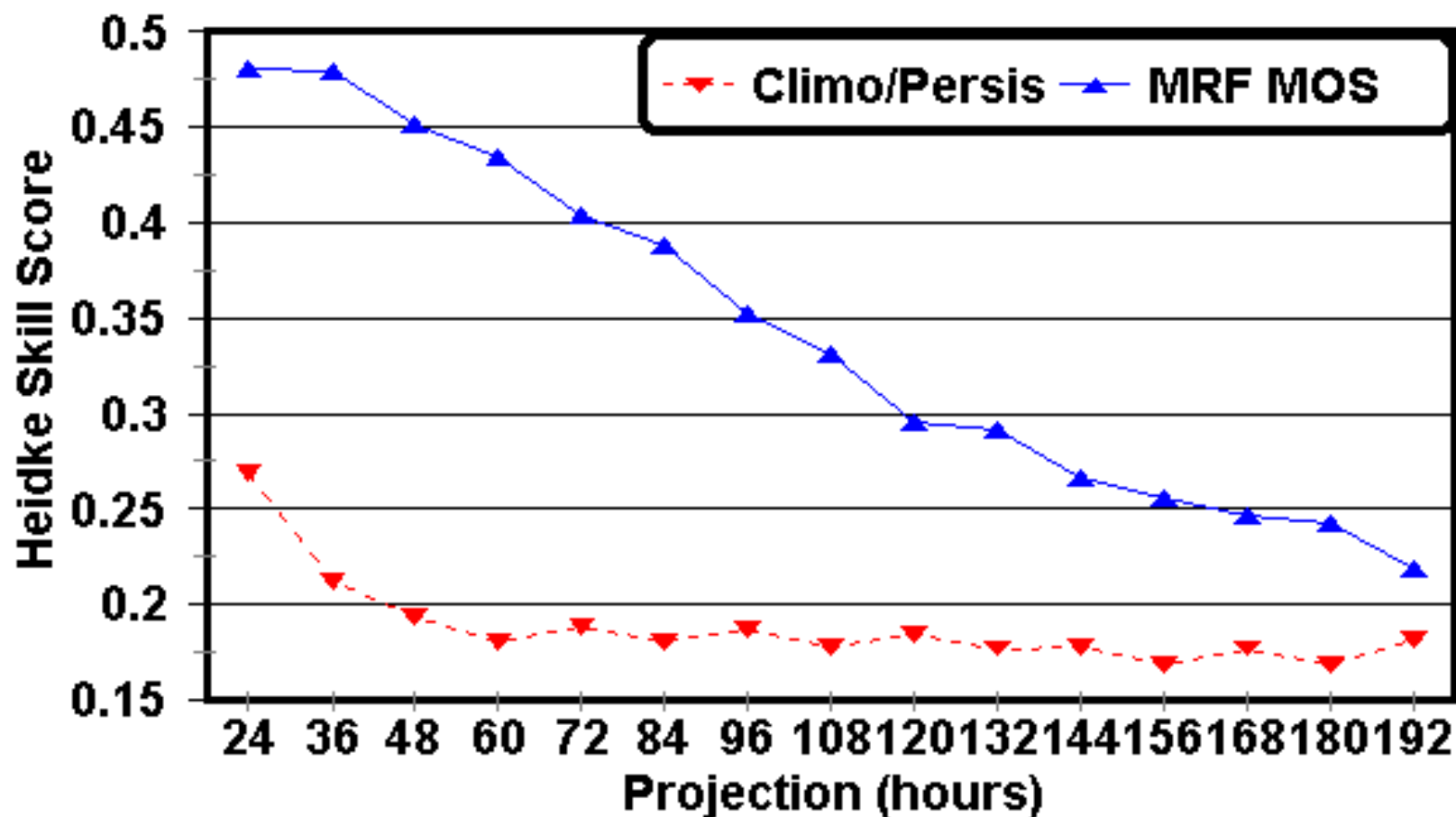
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# Verification of Forecast

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- ▶ Heidke Skill Score
  - ▶ Measures the accuracy of categorical forecasts
  - ▶ Higher score means better forecasts
- ▶ Independent data 1999-2000 Cool Season
- ▶ Verified on 857 stations
- ▶ Benchmark climatology/persistence forecasts

## MRF Total Cloud 1999-2000 Cool Season





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# Conclusions

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- ▶ New MRF MOS system provides more detailed cloud forecasts for more stations
- ▶ Developmental testing shows that MRF MOS cloud forecasts are more accurate than climatology/persistence forecasts out to day 7