



*International Civil Aviation Organization*

**FOURTEENTH MEETING OF THE  
COMMUNICATIONS/NAVIGATION/SURVEILLANCE AND METEOROLOGY SUB-GROUP OF  
APANPIRG (CNS/MET SG/14)**



Jakarta, Indonesia, 19 – 22 July 2010

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**Agenda Item 11: Implementation of SIGMET and warnings**

**2) SIGMET and warnings implementation issues**

**APPLYING GLOBAL ANOMALIES TO AERONAUTICAL  
CLIMATOLOGICAL INFORMATION AND A LINKAGE TO CONVECTIVE  
SIGMET FREQUENCY**

(Presented by the United States of America)

**SUMMARY**

In Annex 3, chapter 8 the use of climatology is mainly aimed at an individual airport based on METAR observations. This paper examines how climatology can also be used for a region based on global anomalies such as El-Nino, and the impact on Convective SIGMET frequency for a given region.

This paper relates to:

**Strategic Objectives:**

- A. Safety – Enhance global civil aviation safety
- D. Efficiency – Enhance the efficiency of aviation operations

**Global Plan Initiatives:**

- GPI-18 Aeronautical information
- GPI-19 Meteorological Systems

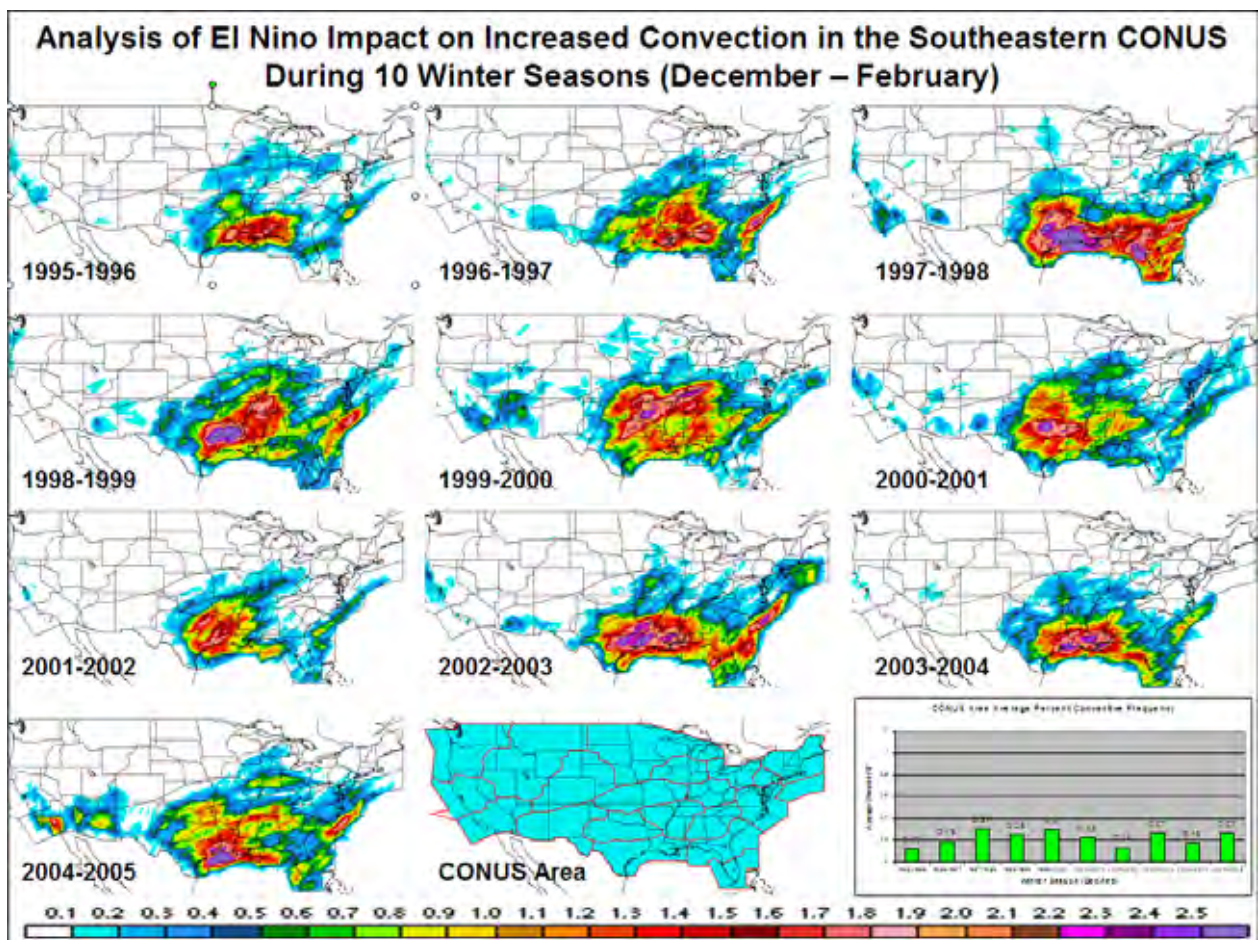
**1. Introduction**

1.1 Most thoughts for applying climatology are generally focused on a single station. For example when reviewing chapter 8 in Annex 3 the direction from WMO is aligned to using a five year or more set of METARs to build climate tables. Those tables then provide a forecaster or user with information on everything from typical pressure curves, to ceiling and visibility frequencies.

1.2 This paper will instead explore how a Meteorological Watch Office can use climatology and take advantage of known global oscillation impacts to anticipate convective SIGMET frequency for a region.

## 2. Discussion

2.1 The MWO in Kansas City evaluates climatology by month, season and year. Over the course of a ten year period the MWO noticed some interesting occurrences that stood out in some geographical areas that are known to be wetter (Southeast and Southwest) or drier (Northeast) during El- Nino years. Take a look at figure 1 below and focus on the Gulf coast area. Three significant El Nino events occurred during this period: 1997-98, 2002-03 and 2004-05.



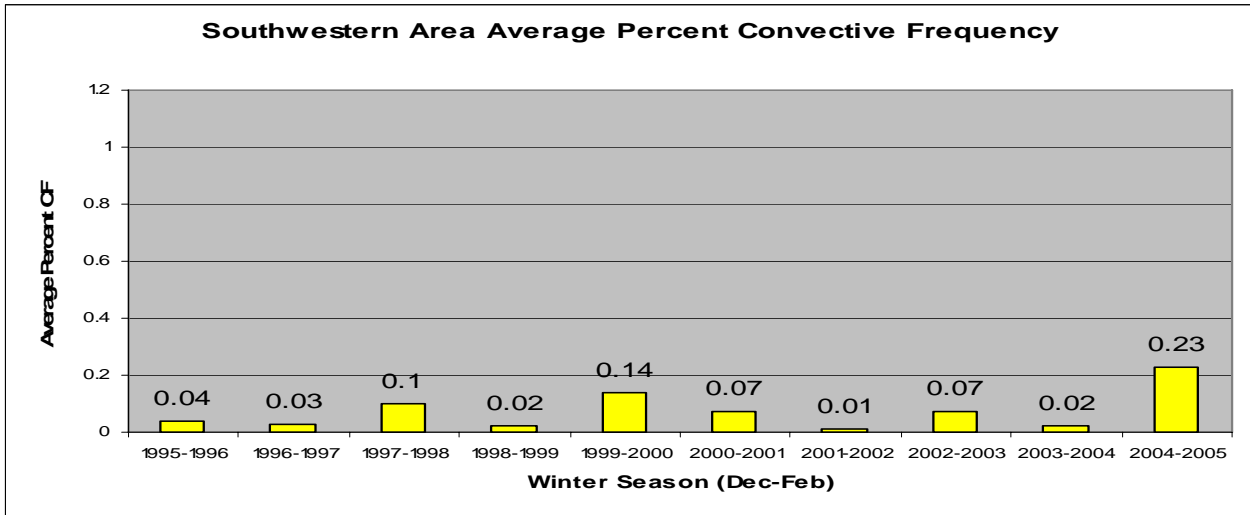
2.2 Next we look at the three US geographic areas of significant ENSO winter precipitation response tendencies. Each of these areas is highlighted in blue. We find during moderate to strong El Nino episodes that it's wetter than normal in the Southwest and Southeastern Areas (Fig 2 and Fig 3), and drier than normal in the Northeast region (Fig 4).

2.3 Below each Figure is a frequency count for the convective SIGMETs that occurred that year. Again we're focusing on the El-Nino years of 1997-98, 2002-03 and 2004-05.

- In figure 2 (Southwest) the highest Convective SIGMET frequencies generally occurred during the El-Nino years.



(Fig 2.)



- In Figure 3 below (Southeast ...Gulf coast area) we see the highest Convective SIGMETs frequencies all three years.

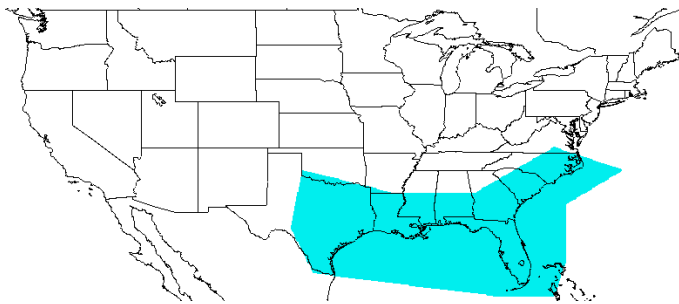
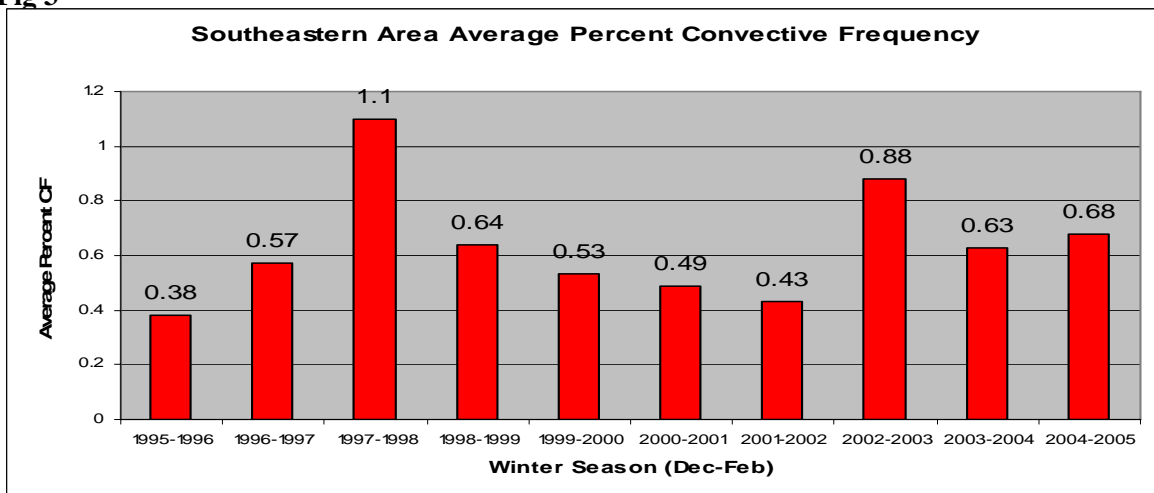


Fig 3



- In Figure 4 below (Northeast area) the El Nino years generally had lower Convective SIGMET frequencies. In addition, the strong La Nina years of 1998-99 and 1999-2000 had the highest Convective SIGMET frequencies.

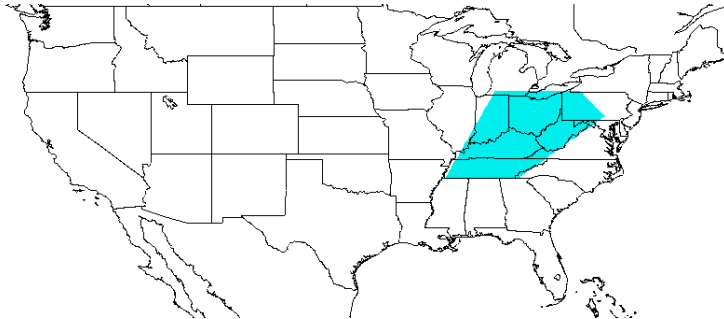
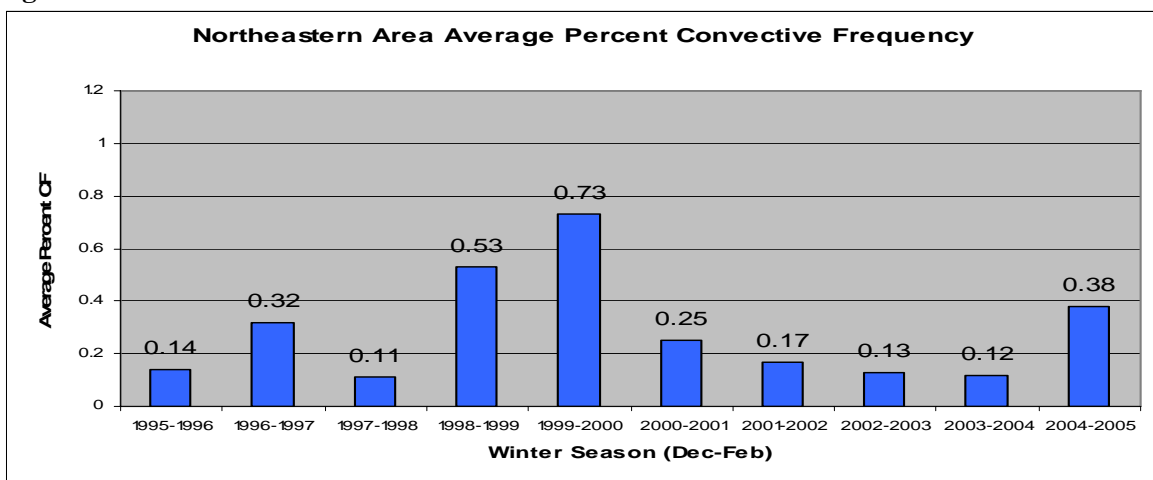


Fig 4



### 3 Conclusion

3.1 This paper illustrates the value of climatology. In this case anticipating the change to climatology based on ENSO can make a difference and impact overall operations. The Gulf coast of the United States obviously is impacted with a significant increase in convection and therefore Convective SIGMETs.

### 4 Recommendation

4.1 The meeting is invited to note the information in this paper.

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