EMS Annual Meeting Abstracts
Vol. 11, EMS2014-11, 2014
14th EMS / 10th ECAC

We meteorologists cannot escape probabilities!

Anders Persson
Swedish Meteorological Society, Norrkoping, Sweden (andersoscar.persson@gmail.com)

Although there has always been a strong element of statistics in weather forecasting this has rarely been reflected in the curriculum. Meteorologists tend to underestimate the problems to interpret statistical verification results, perhaps because the underlying equations are simple.

Lately the emergence of ensemble forecasting has brought to the fore the use of probabilities and other types of uncertainty information. Here is a suggestion of a weekly course in probability theory, which starts from the three different definitions of probabilities:

Monday: From the classical definition of probability of tossing coins and dice, we move on to combinatorics which, among other things, will tell about the problems to add or divide probabilities.

Tuesday: The frequentist definition of probabilities involves statistical interpretation schemes and verification of probability forecasts. Why is it not possible to deceive the “proper” Brier score? How does it “know” my true opinion?

Wednesday: The subjective definition of probabilities is controversial although the maths is simple. From conditional probabilities (the chance of rain if it is windy is normally not the same to have windy conditions if it rains) we move into Bayes’ Rule and familiar applications in forecasting meteorology.

Thursday: Decisions from probabilities serve as the ultimate test both that our probability estimates are reliable and well communicated. While the elementary cost-loss model from the text books suggests we rather take a 80% gamble to win 1000 euros than be given 700 euros straight in the hand, Kahneman-Twersky Propect theory suggests why most people would do the opposite.

Friday: The psychology of probabilities. The communication of uncertainty does not exclusively depend on numerical values of probabilities. Verbal statements can function equally well as well as intervals with tacit probabilities. Even total uncertainty, “not having a clue”, is more informative than a “qualified guess”.