1270

If You Had Nine Contact Hours a Week for a Capstone Course, What Would You Teach? The Synoptic Meteorology Capstone Sequence at the University of South Alabama

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Background

- 12-credit, two-semester Capstone sequence for B.S. in Meteorology
- Must complete Dynamics I & II and Physical Met (junior year)
- Lectures 2x week, 150 min total
- Labs 3x week, 375 min total
- After two semesters, 263+ total contact hours with students!
- Course structure inspired by "disconnects" between undergraduate student education preparation and operational expectations (Blackwell 2011)

Approach

- Lectures focus on synoptic-dynamic meteorology topics
- Labs apply Lecture topics through exercises, real-time city forecasts and student-led current weather discussions

Approach (-cont.)

- Each semester, 8-10 cities chosen to reinforce topics covered in lecture (e.g., located in different parts of mid-latitude cyclone)
- Throughout year, students present as many as six current weather discussions (example, Fig. 1)
  - Graded on application of theory to real-time weather situations
  - Detailed student-led Q&A followed by one-on-one instructor debrief

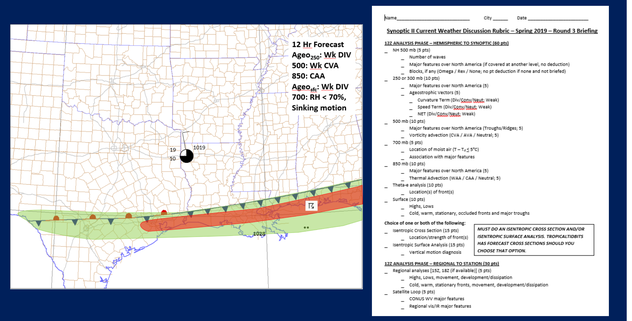

Fig. 1. Example of student forecast discussion slide with summary of vertical motion terms (left); Page 1 of discussion grading rubric (right)

Use of NWP

- In fall, NWP not used in city forecasts or current weather discussions except for 850-, 500-mb charts (QG applications)
- City forecasts are trends only in fall semester to keep students from becoming 'fixated on numbers' (Fig. 2, left)
- Spring semester more practicum-based—'open playbook' includes all NWP products and applications such as MOS, NBM (Fig. 2, right)

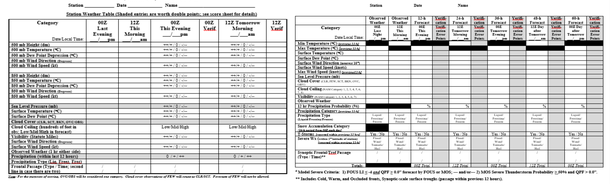

Fig. 2. Sample city forecast worksheet (fall, left; spring, right).

Successes

- Contact time gives in-depth insights into student strengths/weaknesses

Successes (-cont.)

- Approach consistent with research characterizing traits of competent forecasters (Pliske et al. 2004)

Challenges

- Capstone developed in era when NWP wasn't as accurate as today
- Increasing emphasis on integrated decision support and interpretation of ensemble-based and medium-range guidance will require incorporation of these topics
- Challenge is to preserve best parts while adapting to changes taking place in operational environment

References

Blackwell, K. G., 2011: The synoptic meteorology capstone course sequence in the USA meteorology major: A unique and highly successful approach to producing well-rounded and operationally competent meteorologists. *First Annual South Alabama Conference on Teaching and Learning*, University of South Alabama, Mobile, AL, 16 May 2011.

Pliske, R. M., B. Crandall, and G. Klein, 2004: Competence in Weather Forecasting. *Psychological Investigations of Competence in Decision Making,* 40-70.