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Section 12.3 gathering weather data

1 Section 12.3 Weather data collection 2 Data from the Earth's surfaceSasuly 12.3 Weather data Collection Data from the Earth's surface A thermometer measures the temperature. The barometer measures the air pressure. 3 Data from the Earth's surfaceSec 12.3 Weather data collection Data from the Earth's surface Anemometer measures wind speed. The hygrometer measures relative humidity. 4 Data from the upper atmosphereSection 12.3 Collection of weather data from the upper atmosphere of Radiosonde - an instrument used to collect data from the upper atmosphere. Radioprosm sensors measure air temperature, pressure, and moisture. 5 Weather observation systemsSector 12.3 Weather data collection Weather observation system Weather radar Weather radar detects specific precipitation locations. The Doppler effect is a change in resiver or frequency that occurs due to the relative movement of the wave as it comes towards the observer or walks away from the observer. 6 Section 12.3 Weather data collection Weather radar Analysis of doppler radar data can be used to determine the speed and direction of rainfall movement. 7 Section 12.3 Weather data collection Weather satellites Some weather satellites use infrared imagery to measure thermal energy at night to map the cloud cover or surface temperature. Some satellites use cameras that require visible light to photograph Earth and its clouds 8 Section 12.3 Weather Data Collection Weather Satellites 3. A series of satellite imagery is called a water-volatile image that shows moisture in the atmosphere, not just clouds. 9 Section 12.4 Weather Analysis and Forecast 10 Surface Weather AnalysisSection 12.4 Weather analysis and forecast Surface weather analysis station models Station model is a record of weather data for a given location at a given time. 11 Section 12.4 Weather analysis and forecast Meteorological symbols are used to display weather data in the station model. 12 Plot station model dataSeaction 12.4 Data on the weather analysis model and forecasts Plotting station For data planning across the country and around the world, meteorologists use lines that link points of equal or constant value. 13 Plot station model DataSection 12.4 Weather analysis and forecast Isobars plot model data - same pressure lines Isotermi - same temperature lines 14 Interpretation of station model DataSection 12.4 Weather Analysis and Forecast Interpreting Station model data The weather map shows isobars and air pressure data 15 Interpreting station model dataSection 12.4 Weather Analysis and Prediction Interpreting Station model data Using isobars , isothers and station model data, meteorologists can analyse the current weather conditions for a specific location. 16 Forecast types Digital forecastsSec 12.4 Weather analysis and forecasts Forecast types predictions Digital forecast - created using physical and mathematics to atmospheric variables to make a prediction. 17 Section 12.4 Weather analysis and forecast Analog forecasts Analog forecast - comparison of current weather patterns with similar weather patterns from the past. 18 Section 12.4 Weather Analysis and Forecasts Short-term forecasts - the most accurate and detailed forecasts because weather systems change direction, speed and intensity over time. Long-term forecasts Long-term forecasts are less reliable than short-term forecasts. Chapter 12 Meteorology Name_____Period_____ objectives 1. I can compare the weather and the climate. 2. I can analyse how the imbalances in the heating of the Earth's surface are generated by the weather. This means you can: a. Describe the angle and effect of solar radiation that hits different areas of the earth. B. Explain why the temperature of the different regions of the earth remains relatively constant. 3. I can describe how and where the air masses are formed. This means you can. a. Determine the air mass. B. Tell the relative temperature, humidity and source location of mP, mT, cP and cT air masses. c. Understand which air masses are usually associated with US regions. Describe the change in air mass as the air mass movements made over a specific location. 4. I can define the Coriolis Effect, explain its cause and describe its effect on global air movement. 5. I can compare and contrast the world's three main wind systems. This means you can: a. Describe the wind direction of each system. B. Set the width limits of each. c. Describe the direction of air flow (sink or lift) at each width of the boundary. d. Know which wind system is connected to the doldrums and horse distances. E. Describe where the jet streams are located and why they are located there. 6. I can identify the four main types of fronts. This means you can: a. Define the front types and direction of movement at the front based on the map symbols. B. Define the type of front based on the temperature differences between the two colliding masses. c. Specify the type of front side that is the air mass temperature on the move. d. In contrast to the rate of air growth, a series of clouds are formed, the severity and length of precipitation normally associated with each. 7. I can compare and contrast high-pitched systems. This means you can: a. Describe the usual weather or cloud cover with each. B. Contrast them with increasing/diving in terms of air, moving to/from the centre and direction of rotation. c. Give examples of val cyclones. 8. Identify the importance of accurate weather data. This means that I can describe the use of each of the following instruments: anemometer, barometer, ceilometer, hygrometer, radiosonide, thermometer, wind. 9. I can describe the technology used to collect weather data. That means you can. Unlike the use of radios, weather satellites, weather radars, Doppler radar. Contrast the pros and cons of infrared vs. visible light satellite imagery. c. Know, used primarly for rainfall tracking, cloud tracking, precipitation and speed determination or data collection at the upper level using multiple sensors. 10. I can analyze the basic surface weather chart. This means you can: a. Determine wind direction and relative speed based on isoconic spacing and numbers. B. Describe the weather in a specific city using the station model symbols when the key is given. 11. I can distinguish the contrast long against short-term forecasts and explain which is more accurate. 12. I can define and use the following additional different terms: isoplets, isoterm, isobar Section 12.1 – Causes of weather 1. Meteorology is studying the atmospheric phenomena of world 2. The weather is _____ Climate is _____change of weather for a specific area (Average more than _____ years) Document1 -1- 5/12/2017 How does the sun give energy to the earth? Sunny angle against heat 1. The sun heats _____ In the tropics there are condensed and intense rays that make the tropes _____3. The poles a_____ angle and _____intense rays. The pole receives the same amount of energy as in the equator, but the energy spreads more & is_____ Why doesn't the earth go too far on the equator? 1. Air currents and oceans _____currents continually _____The air mass is _____body the air that assumes the characteristics of _____ forms 3. The region of origin is the region _____ formed by the air mass Air mass Air mass Classification (see Fig. 12-3 p. 303) Classification is determined by 2 letters: 1. Humidity is represented by _____letter a. Maritime (m) is _____b. Continental (c) is _____ 2. The temperature is represented by _____letter: a. Tropical (T) is _____b. Polar (P) is _____ 3. Exception: a. Arctic air mass (A), presented in a single capital letter. Similar to _____ but lots _____ 4. Examples: a. What would an MP air mass look like? _____The air masses change and change with the take over _____For example, air masses can be _____ moisture and take _____characteristics if they are away from the body of water they formed above 3. An example of the question: The cold, mokar air mass that brings cloudy, rainy weather to Pacific NW is an example of what kind of air mass? a.b.c. d. Continental tropical maritime polar maritime tropical tropical section 12.2 Weather Systems 1. Effect: Air particles must be deterd (pushed to the side) as the air moves from poles to equations due to _____ Creates _____ 305 Global blown systems See Fig. 12-4b p 305 Document1 -3- 5/12/2017 1. Trade winds: Wind patterns _____ and _____ from the equator are the result of this. (Fig. 12.4b) a. _____at equation: _____at _____Trade winds are NO or SE commercial winds because they blow from _____Winds are named after the direction wind _____ from. d. Horse planes are _____winds on _____e. Doldrums on _____are also _____winds 2. Dominant Westerlies: Flow between 30o and 60o N&S. a. According to their name, you know that they are blowing from _____b. Causes most of the weather in _____3. Polar Easter: Flow between 60s and pole _____N & S. a. By their name, you know that _____bands the blows from _____The cause is _____differences where 2 _____global the wind systems _____collide_____Subtropical stream of the plane where _____which front 1. At the front is a narrow region that separates two air masses from _____2. 4 main front types: a. _____fronts b. _____fronts c. _____fronts d. _____fronts 3. See Figure 12-7 pp. 308 IMPORTANT Document1 -4- 5/12/2017 Cold Fronts 1. In cold fronts, cold, dense air movements & PUSHES warm air _____thunderstorms 3. _____line with _____triangles in the direction in which the front is moving Warm Fronts 1. In the warm fronts, _____Clouds (_____), showers, _____2, 2014 in New York The warm air rises in _____Create _____band _____Rain & Fallout From 4. ____ Stationary fronts 1. Stationary fronts occur when two air masses meet, but _____because the differences in temperature and density are _____1st _____weather: Clear vs. or no precipitation against storms, no rain against rain days. 2. A combination of _____diagrams with short segments of triangular & red semicircles pointing _____blue _____directions Okcluded Fronts 1. Ocluded Fronts occurs when the cold front _____warm front & then hits another cold air mass 2. All ____air are moving to _____It forces all the warm air _____between the two cold air masses & warm air is okcluded & c _____4. _____line Low pressure is associated with _____air 2. High pressure is associated with _____air 3. Pressure = _____in the northern hemisphere 3. The air is the spy _____4. The _____Weather (_____Clouds) Low pressure systems 1. In low-press systems, the less dense surface air is _____2. Roti _____in Northern Hemisphere 4. The increasing air is causing _____High pressure systems 1. In high pressure systems, heavy air falls on the earth's surface and _____2. Rotate (rotate) _____They can form a wave of cyclone-bad weather at medium lengths like us: _____Meteorologists take into account _____2. Tools: a. Thermometer b. Barometer: action '_____c. Anemometer: Actions _____Hygrometer: actions _____Ceilometer: Measures _____cloud layers and the amount of sky covered by clouds Automated surface observation system 1. 1,700 different weather siteas across the U.S. collected information for the National Weather Service every hour 2. Provides _____The weather is caused by changes _____in the _____a. That's why we need weather measurements at more than 30,000 m 2. Radioprodas are sensors attached to high weather _____that measure air temperature, wind speed, humidity, and pressure Weather Radar 1. Weather radar is used to search _____2. The transmitter creates _____and sends them out with a radius of 200 km 3. Waves jump away from the big _____and the radar system detects where the waves are To show me where Doppler Radar 1 is raining. Uses the Doppler effect as a result of a change in _____Doppler Radar, like weather radar, senses the rainfall zone, but also determines _____how quickly the rain drops are _____away from weather station 3. The combination of precipitation IN _____gives this technique a distinctive advantage Weather Satellites 1. Weather satellites have _____that _____of earth at regular intervals of 2. They are used to track _____Infrared images Where did we see infrared radiation used earlier? 1. Infrared detects differences in _____of the cloud cover and Earth's surface a. For example, really cold cloud temp can _____clouds & _____2. Priority: You can use _____3. It can be used to map weather patterns as well as Document1 -7- 5/12/2017 Section 12.4 Weather Analysis 1. The station model is the weather data record for _____on a _____2. See Appendix E p.915 for Surface Analysis for Nat'l or Global Models 1 weather symbols. The lines that link the _____The outlaws are lines of the same _____What does a lot of the outlaws that close together? _____The wind is blowing from _____pressure to _____pressure d. The outlaws show the locations of _____Displays the temperature _____b. Tight spaces areothers (rapid temperature change) show the location _____where two _____meet in the short term vs. Long-term forecasts 1. Long-term forecasts are _____as short-term forecasts Document1 -8- 5/12/2017 Tips for studying part 1. Textbook reading A. Goals at the beginning of this outlines the notes and each textbook chapter B. Word Vocab: italic at the beginning of each section, and bold throughout the text C. Questions at the end of each section and at the end of chapter D. Summary of the page at the end of chapter 2. Notes and worksheets in Class 3. Links on my website: A. Take an on-line quiz on the online textbook link i. Chapter Resources ii. Unit 4 iii. Chapter 12 iv. On-line study tools in. Choose an online quiz or interactive tutor (game) B. Quiz web link: print flashcards, vocab games, vocab tests Bellwork #1 Previous Knowledge 1. What is the difference between weather and climate? 2. List used by meteorologists. Bellwork #2: Sec review 12.1 1. Write symbols for the following: A. Cold & dry air mass B. Cold & humid C. Warm & dry 2. Raining. Is this a statement about the weather or the climate? Commented. Bellwork: Section 12.1 Assessment p. 304 Bellwork #3: Temperatures & Season Causes 1. What factors warm a particular place on Earth? 2. What causes the seasons? Bellwork #4: Global Wind System Review 1. High or low pressure present on the earth's surface on the pole? A. What does that show you on the diagram? B. Why are clouds forming in the equator? Be specific. Document1 -9- 5/12/2017 2. What causes the plane to flow? Bellwork #5: Section 12.1 Rating p. 311 Do questions #1, 2, 4, 5 Bellwork #6 Type of Front?? For each image, top and bottom, list: 1. Type front 2. Describe in particular what you see in the diagram, which tells you that the front type bellwork #7 weather instruments 1. What is Doppler Radar's main advantage over conventional weather radar? 2. Compare (similarity) and contrast (difference) infrared against visible light image. Bellwork #8 Miscelle Rating 1.3 Global Wind Systems: The Name of the Wind System Rises On?? Sinks on??? Blow W ...E or E ...W? 2. Draw a symbol for the high pressure and low pressure system, including arrows showing the direction of wind on the fly. 3. Name 3 tools/instruments used by meteorologists. Describe what each action is. 4. What is the difference between isobic & isothers? Document1 - 10 - 5/12/2017 Bellwork #9 Miscello september 1, 2017. What is radioprosh? Explain what it's used for. 2. What is an analog forecast? What is it used for? 3. Cyclone wave. Do we have them in Iowa? Commented. 4. As the air mass is changing from where it is formation, its characteristics change. What is the vocabulary that describes this change? Demo: Air Masses & Fronts Observations What Happens at the End of Ice? What happens in the end without ice? 1. Describe where the clouds are coming from. 2. Describe where condensation and precipitation form. 3. Specify which part of the box represents cold air mass. 4. Specify which part of the box represents the warm air mass. 5. Close where the weather front is in your box. 6. Describe where the front has moved. 7. Specify what front you have made. Document1 - 11 - 5/12/2017 5/12/2017