

## **SIO 15 (FQ 2024) – Homework #7 Due November 19, 2024**

Maximum score: 20 points + 1 bonus point

- 2 penalty points for late submission (more than 30 min past due date)

Divide by 4 for contribution to total cumulative

- 1) Watch the homework 7 video on the class website!**
- 2) Add your full name (your family/last name first) to the top on each page.**
- 3) Provide only answers (not the questions!) in the document you submit.**
- 4) Label each of your answers (1a, 1b, 1c etc.), starting a new line for each of your answers.**
- 5) Provide short answers. Shorter is better! No full sentences required. Definitely no long answers. Points may be subtracted for answers that are too long/answers given that are not relevant to the question (including cut-and-paste jobs of entire sections from the class website).**
- 6) include appropriate units where needed (not just numbers)**
- 7) Hand-written ok as long as the handwriting is easily readable.**
- 8) Submit a single pdf to Gradescope. Only submit a high-quality pdf. Cell phone photo scans are not ok! Instead, use a professional app, such as Turboscan.**
- 9) Important!!!!!! After you uploaded your pdf but before hitting the submit button, please identify on which page each of your answers to problems 1 - 10 are. Only when this is completed, hit the submit button.**

## **Topics 19 – 20**

- 1) a) When is the typical hurricane season in the Atlantic? (0.25 pt)  
b) Go to Wikipedia and find the 2024 Atlantic hurricane season: during which months did the four strongest hurricanes occur? (0.25 pt)  
c) What were the names and category of these hurricanes? (0.5 pt)  
d) look up each of these hurricanes in Wikipedia. For each of them, log the following: calculated duration (dates of dissipation minus formation), highest wind speed (in km/h), lowest central air pressure (in mbar), most affected area? INCLUDE UNITS. (1 pt)  
(2 points total)

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- 2) a) According to the old Saffir-Simpson scale **on the class website**, what are the maximum wind speeds and lowest central air pressure each of category 4 and 5 hurricanes? include units (0.5 pt)  
b) Check your answers under 1c and d. Compare each of your answers for wind speeds with the values under 2a and write down whether this matches the declared category, and if not, into which category would this storm fall? (0.75 pt)  
c) Now do the same for the central surface air pressure. (0.75 pt)  
(2 points total)
- 3) a) Describe how, chemically, a fire is a reverse process of photosynthesis. (0.5 pt)  
b) Name and describe each leg of the fire triangle. (0.5 pt)  
c) How can each leg of the fire triangle be removed by fire fighting/prevention measures? (0.5 pt)  
d) What are the four stages of fire? Include a short description of each. (0.5 pt)  
(2 pts total)
- 4) a) What are the three main factors that define a Santa Ana? (0.5 pt)  
b) How does a Santa Ana change one of the four stages of fire? (0.5 pt)  
c) What are two ways how Santa Ana winds influence the spread of a wildfire? (0.5 pt)  
d) In southern California, when do most Santa Anas occur? When is the wildfire risk the greatest? (0.5 pt)  
e) Explain why the two answer under d) would be different? (0.5 pt)  
(2.5 pts total)
- 5) Go to Wikipedia and search for the list of California wildfires.  
a) In the last 24 years, which four years had the highest number of wildfires? Provide the corresponding numbers. (1 pt)  
b) In the last 24 years, which four years had the largest acreage burned? Provide the corresponding numbers. Include units. (1 pt)  
(2 points total)
- 6) Stay on that same Wikipedia page:  
a) In terms of single (complexes of) wildfires, which four had the largest burn area, also provide numbers (with units!) and the year they occurred? (0.75 pt)  
b) Now do the same for the four deadliest wildfires. (0.5 pt)  
c) Given the notes in the tables what was special about the 2021 Dixie fire? What about the 2024 Park fire? What about the 2017 Thomas fire? What about the 2018 Camp fire? (0.75 pt)  
(2 points total)
- 7) Go to Wikipedia and search for the Line fire:  
a) In which county and in which state did this fire start? (0.5 pt)  
b) When did the fire start, when did it end? (0.5 pt)  
c) What is the acreage burned? How many people were killed? (0.5 pt)  
d) What was the cause of the fire? (0.5 pt)  
(2 points total)

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- 8) Search for Hurricane Helene in Wikipedia:
- a) When did the storm form, when did it dissipate? (0.5 pt)
  - b) This storm broke which three recent records? (0.5 pt)
  - c) How many people were killed? List the total as well as, for the U.S., the numbers and state for the top four states. (0.5 pt)
  - d) In terms of the most intense hurricanes making landfall in Florida, where does Helene place? Which one is top? (provide year and name). (0.5 pt)
- (2 points total)
- 9) Go to Google Earth:
- a) Place a placemark at 34.05°N/118.26°W. Consider this downtown Los Angeles. Search for Camarillo, CA, the location of the Mountain wildfire. Measure the distance between Camarillo and downtown LA. Error margin (3 km) (0.5 pt)
  - b) Imagine you drive from downtown LA to Camarillo on the 101, what is the distance driven considering only to route driven on the 101. Provide both numbers, the one for km as well as miles. (error margins: 3 km/1.86 mi). (0.5 pt)
  - c) Which major city is just to the southwest of Camarillo? (0.5 pt)
  - d) Click on the Wikipedia box of that city. In terms of population, where does this city place in the U.S.? Where in California? Thirdly, this city is the largest in which county? (0.5 pt)
- (2 points total)
- 10) Google Earth (GE): download the kmz file and load it into Google Earth. This shows the path and physical data of 2024 Hurricane Helene. Work only with the symbols given along the track.
- a) As what and when (date and time UTC) did the storm originate? (0.25 pt)
  - b) How much later (days and hours) did it become hurricane? (0.25 pt)
  - c) From that point, how much later did it become a major hurricane (category 3)? (0.25 pt)
  - d) Given only the symbols along the track, measure the shortest distance to Cancun, Mexico. error margin: 10 km (0.5 pt)
  - e) Given only the symbols along the track, measure the shortest distance to Havana, Cuba. error margin: 10 km (0.5 pt)
  - f) During which 6h-window did the storm make landfall in Florida? (provide date/time) (0.25 pt)
  - g) What is this time window in EDT (provide date/time)? (0.5 pt)
- (2.5 points total)