

HAB Flight “Beverage Cart”



INTRODUCTION

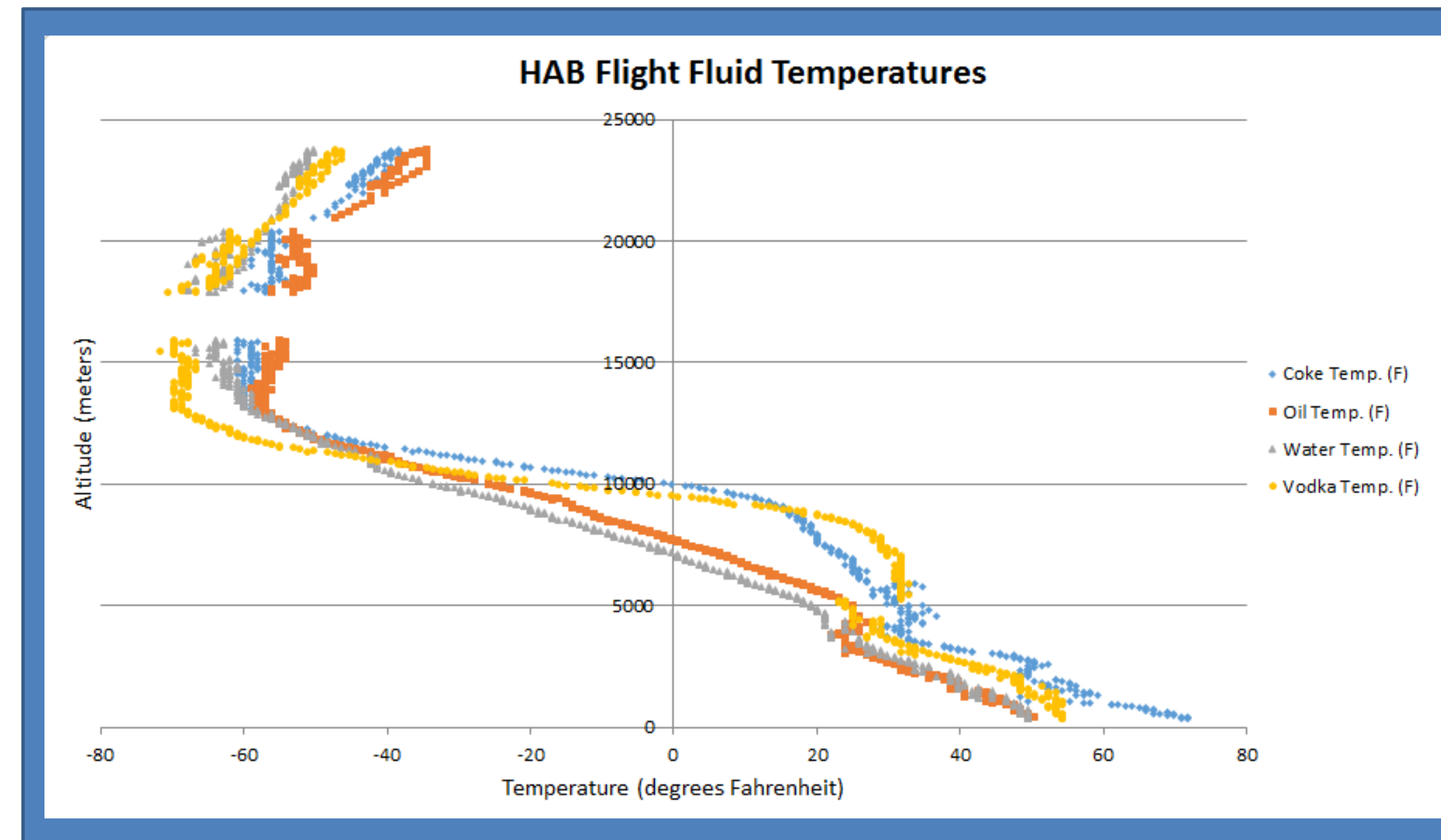
Being served a beverage during an airline flight has become common practice. The flight attendant is stocked with a variety of options to wet your whistle. Our experiment for the High Altitude Balloon flight was to understand how different fluids would change temperature with altitude. Would certain beverage choices change temperature more than others? Will flight attendants need to be prepared to serve your favorite beverage during a (highly theoretical) manned HAB flight??



Temperature sensors outside pod



Vials filled with each fluid pre-flight



Fluid	Starting Temp. (F)	Temp. at Highest Altitude (F)	Difference
Coca-Cola	71.87	-38.478	110.348
Vegetable Oil	49.41	-34.57	83.98
Water	49.41	-51.17	100.58
Vodka	54.29	-46.29	100.58



Pods and balloon getting ready for launch

CONCLUSIONS

Overall, we were pleased with the results found from the HAB flight. Our prediction that the oil experienced the smallest temperature change was correct. We predicted the Coca-Cola would experience a smaller difference, but the results are very similar. We would have to try the experiment again to define a conclusive ranking largest to smallest.

Answering our question related to beverage cart service on a High Altitude Balloon flight, we concluded that flight attendants shouldn't expect to serve passengers on a manned HAB anytime soon. While most passengers prefer their beverage ice cold, -51 degrees cold is probably a bit too much.

RESULT

A scatter plot of the temperature of each fluid at different altitudes shows all experienced relatively similar changes in temperature. The vodka and water reached the coldest temps while the vegetable oil stayed the warmest in high altitudes.

A comparison table showing change in temperature for each fluid shows water and vodka experienced the same change in temp. while the soda had very similar results. As predicted, the oil experienced the least amount of temperature change during the flight.

METHOD

Given four battery-operated temperature sensors, we chose to measure water, Coca-Cola, vodka, and vegetable oil (for comparison, not consumption). We predicted the temperature would decrease on all liquids. We were most interested in the change in temperature for each type of liquid, suspecting the water will experience the largest decrease, followed by the soda, then the vodka, and vegetable oil having the smallest change.

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