Wave flying from Hollister
Harry Fox
October 26, 2016

1. Two types of wave days at Hollister:
    a. Pre-frontal wave.
        i. A low pressure center is located to the northwest, with a warm front then a cold front sweeping across the Bay Area. Winds ahead of the cold front come out of the south to southwest, with the strongest winds just before the cold front arrives.
        ii. This triggers wave off the Gavilan Range and Fremont Peak. The wave bars are generally located upwind of Hollister, and secondary or tertiary wave may be located right over the airport. Some years ago, Miguel Flores rode this type of wave to 17,999 MSL right over Hollister. The wave location may be marked with lennies and/or lines of rotor clouds.
        iii. Prefrontal wave is often associated with increasing clouds and then rain. Some days with good pre-frontal wave there is a solid high-altitude cloud deck that lowers over the course of the day, capping how high you can go. On the day Miguel caught the wave over Hollister to 17,999, rain arrived soon after he landed. If there are lennies, be careful when flying above them as a solid cloud deck can fill in below you.
        iv. The best prospects for soarable pre-frontal wave are when the forecast calls for a dry cold front but strong winds. But even with a typical front that brings some rain to Hollister, there may be a window of a few hours with good wave soaring before the rain arrives. Note that rain amounts usually decrease as you go south, so it may be dry enough for soaring at Hollister even while it's raining in the Bay Area.
        v. On a good day, an adventurous pilot with a willing ground crew could ride pre-frontal wave into Southern California as the front sweeps south. We have also found pre-frontal wave at Panoche on one of our Panoche weekend events, on a spring day that had rain showers and a solid cloud deck at Hollister.
    b. Post-frontal wave.
        i. After a storm comes through, if the low pressure center continues to our south and high pressure fills in to the north, there may be strong winds out of the north to northeast.
        ii. This generates north-wind wave off of mountain ranges that trend northwest-to-southeast, including the Santa Cruz Mountains. Places to find this wave near Hollister include over Casa de Fruita and at the north end of the Quien Sabe Valley. But the best location is often downwind of the Santa Cruz Mountains in the area between Aromas and Watsonville.

iii. Post-frontal wave usually has few if any clouds. I have sometimes seen rotor cumulus at low altitudes marking the wave location, but I have not seen significant lennies in this type of wave.

iv. Some spectacular flights have been had in post-frontal wave, including Ramy Yanetz's flight out of Byron into the Mount Diablo wave that took him over the top of the Class Bravo airspace, directly over downtown San Francisco. On the same day a number of us launched out of Hollister and caught the wave over Watsonville, going to 17,500 or so and some met up with Ramy over Boulder Creek. Many years ago before there was Class Bravo airspace, Jim Indrebo rode post-frontal wave from Calistoga to Monterey and back.

2. Flying the wave.
    a. I have not had much luck trying to thermal into wave around Hollister, since most of the wave is in winter when thermals are weak. I usually had to tow into wave at around 4,000 to 5,000 foot altitude. I did stumble into wave once over Coalinga late on a thermal day in June, saving a long flight by getting high enough for final glide back to Hollister.
    b. In pre-frontal wave you generally tow upwind of Hollister towards the Gavilan Range, so you have an easy downwind run back to Hollister if you don't locate the wave. In post-frontal wave you may need to tow over to the Watsonville area and accept Watsonville as your "out" if you don't find the wave. Or tow north near Anderson Reservoir with South County Airport as your "out". Note that the grass runway at Frazier Lake is often closed in the winter when it gets too muddy after rain.
    c. A GPS device with a moving map display is a big help in wave, so you can see your ground track and return to areas where the wave was working. You will need to crab across the wind to stay in the wave band. If you lose the wave, explore upwind.
    d. If you get caught above a cloud layer, run downwind to dryer air where the clouds thin out. From the Hollister area, maybe head for Los Banos or other Central Valley airports. A ground retrieve is a lot safer than trying to descend through cloud. If you are planning a cross-country flight, pay attention to runway orientation and predicted surface winds -- some airstrips may not be safe because of strong crosswinds.
    e. Dress warm! Temperatures at 17,000 feet are COLD even though it might be in the 60s on the ground. In north-wind wave, the glider will be pointed north for long periods so the sun will be behind you and not providing much warmth in the cockpit. BASA flight rules on 1CH and 5KM prohibit flight at temperatures below -10C, to protect gelcoat from cracking.
    f. A working transponder is a must if you are going high in the wave (above 8,000 feet or so) in the areas north and northwest of Hollister, because you will be flying into the arrival paths of airliners headed for San Francisco and San Jose. Arrival traffic for SFO typically crosses the coastline at Calistoga between 10,000 and 15,000. Arrivals for SJC typically cross the Gilroy area at about 8,000.
    g. Winds at altitude can be quite strong -- I've seen 60 knots or more at 16,000 ft. You may need to fly much faster than minimum sink speed just to stay in place. You may need to

penetrate into strong winds and strong sink to get back to Hollister as you leave the up part of the wave. I lost about 8,000 feet one day in less than 15 nm traveled, returning from the Watsonville area to Hollister.

h. Someone pointed out , if you had to bail out over Watsonville at high altitude in a 60 knot north wind, your parachute will drift you well out into Monterey Bay before you splash into the cold water. Time for skydiving lessons?

3. Forecasting wave weather.
    a. Pay attention to the general pattern. If stormy weather is forecast, look for indications of windy conditions both before and after the rain.
    b. What you want:
        i. Wind speed 20 to 30 knots at ridgetop level (850 mb), increasing with altitude. Weak wave may occur with even lower wind speed at ridgetop if other factors are favorable.
        ii. Wind more or less perpendicular to ridgelines.
        iii. No abrupt shifts in wind direction with altitude.
        iv. Stable layer around ridgetop level.
        v. Not a strong thermal day -- strong thermals can disturb the wind flow and break up the wave.
    c. If there are a series of frontal systems coming through, the first one will usually give the best pre-frontal wave. This is probably because of unstable air left behind from first front is encountered by subsequent fronts.
    d. Sources of weather info:
        i. National Weather Service Area Forecast Discussion. Access from "AFD" link on NWS Monterey forecast page: http://www.wrh.noaa.gov/mtr/forecast.php
        ii. Dr. Jack's WINDIP forecasts. http://www.drjack.info/WINDIP/index.html
        iii. Forecast sounding plots: http://thams.com/flying/skewTmap.html
        iv. RASP Vertical Velocity forecast maps:
            1. http://www.norcalsoaring.org/BLIP/BYRON/index.html Large-scale RASP maps (3km grid) are available up to two days in advance in the Byron RASPs. These can show if there will be wave and the general location. Fine-scale RASP maps (750 meter grid) are available the night before and are often surprisingly accurate in forecasting wave location.
            2. http://avenal.raspmaps.com/index.php Large-scale RASP maps, up to three days in advance.
            3. 850mb is about 5,000 ft, the altitude at which you are trying to contact wave. 700mb is at about 10,000 ft and 500mb is at about 18,000 ft.
        v. hgcgroup e-mail group on Yahoo. Experienced pilots will often post here when they see good soaring conditions ahead.
        vi. Golden Gate Weather Service: http://ggweather.com/loops/ncep_loops.htm. With the GFS model, you can look ahead about 2 weeks. Don't expect high accuracy that far out, but use it to

discern the "mood" of the upcoming weather (recommended by Kempton Izuno).

vii. Unisys weather pages: http://weather.unisys.com/gfs/index.php?r=us. Another source of long-range forecast maps, looking ahead up to 10 days.

viii. https://www.windytv.com Nice visualizations of wind patterns at different altitudes and forecast times, plus many other forecasting features.

ix. www.skyvector.com Under Layers, select the Weather tab, then scroll down for Show Wind Barbs. Click on the gear symbol to the right to set altitude and forecast time. Wind barbs appear in sectional chart view where grid lines cross.

e. An example of a successful forecast of post-frontal wave, including some detail on how to read WINDIP forecasts: http://www.drjack.info/twiki/bin/view/BLIPinfo/WINDIPHollisterWavePrediction

Excerpt from Area Forecast Discussion issued Sunday afternoon October 23.

Synoptically a longwave trough will set up to our west with an associated surface low that will pull in subtropical moisture. The low will rapidly deepen and approach the Northern California coast as a cold front moves through. Although there is still some disagreement with the details, in general there is good agreement that widespread rain can be expected Thursday into Friday. Periods of moderate to heavy rain are possible although at this time there is a wide range of solutions for where the main plume of moisture will be focused. In light of the ECMWF consistency decided to heavily weight the forecast toward its solution. Rainfall amounts are very tricky due to the uncertainty of the main focus of moisture, although would expect some of the coastal hills to get 2 to 4". Southerly winds will also be on the increase for Thursday and Friday as the gradient tightens. Higher elevation spots could see gusts well over 30 MPH.

Example of WINDIP for Salinas area, issued on Sunday October 23. Note strong winds out of the south forecast from 10/24 through 10/26.

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DrJack's WINDIP Upper-Air Wind Forecast for  SALINAS  on  SUN 10/23

ALERT@ 24:*avn 48:*eta

------  WS,WD,U(kt)  SITE=ksns  METAR=ksns  RidgePerp.=210  Run:10/23@16:29Z-16:35Z

RUC  :  00=99/OCT:23Z  03=10/23:18Z  06=10/23:21Z  09=10/24: 0Z  12=10/24: 3Z
300mb:    54 227  52    57 223  55    59 221  58    62 223  60    62 221  61
850mb:    18 197  17    19 196  18    19 189  18    22 184  20    26 198  25

-------------------------------------------------------------------------------

NAM  :  00=10/23:12Z  12=10/24: 0Z  24=10/24:12Z  36=10/25: 0Z  48=10/25:12Z
300mb:    57 229  54    61 225  59    61 226  59    55 261  35  * 92 263  55
850mb:    18 191  17    21 185  19    20 209  20    20 215  20  * 22 204  22

GFS  :  00=10/23:12Z  12=10/24: 0Z  24=10/24:12Z  36=10/25: 0Z  48=10/25:12Z  60=10/26: 0Z  72=10/26:12Z
300mb:    54 228  51    59 223  57  * 71 220  70    51 257  35    90 263  54    65 256  45    62 235  56
850mb:    21 191  20    21 188  20  * 24 209  24    19 224  18    15 218  15    10 180   9    26 188  24
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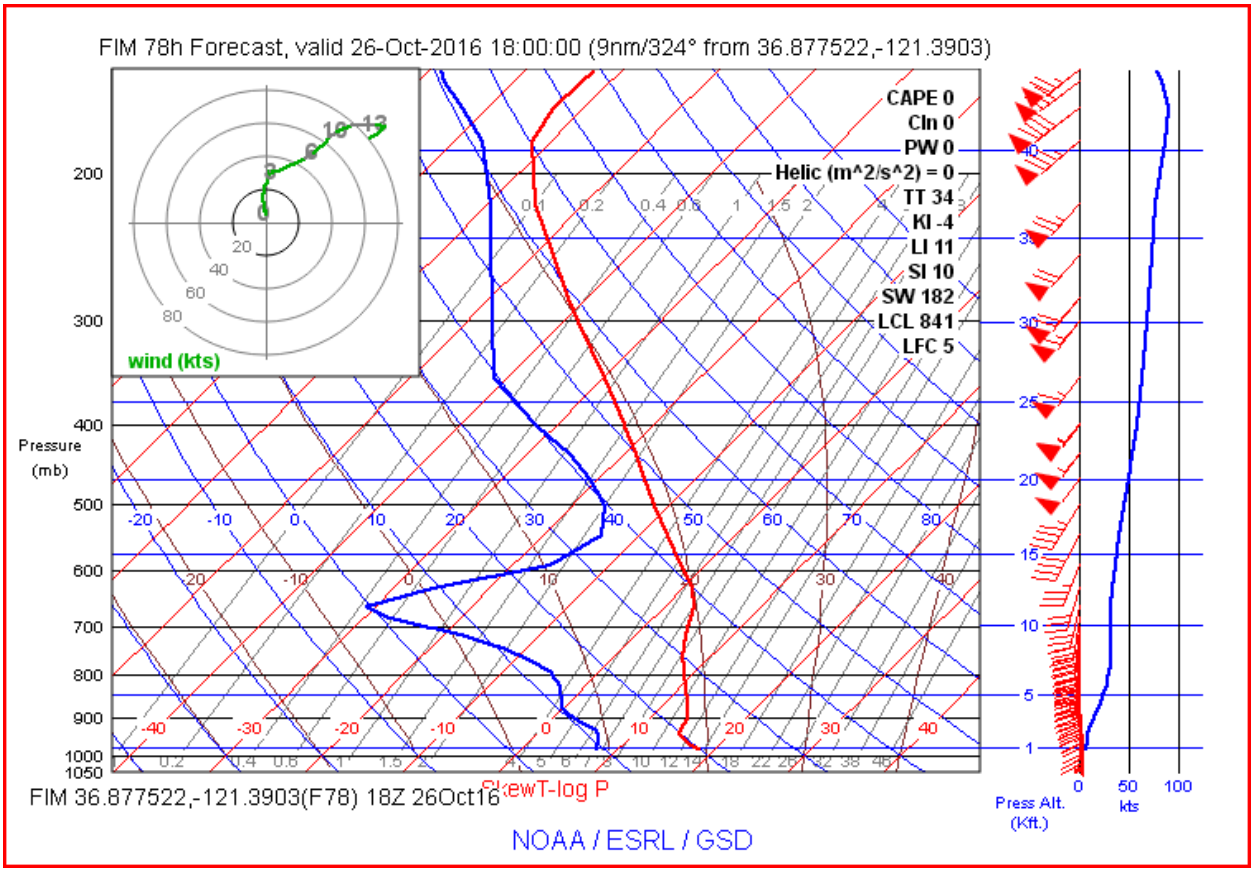
Example of forecast sounding for Wednesday October 26, generated Sunday October 23, 2016. Note wind barbs on right, wind speed indicated by blue line on right with scale at bottom, and stable layer on red temperature plot from about 2000 ft to 12,000 ft.



Example of RASP Vertical Velocity chart for Sunday October 23, 750 meter grid, 700mb height. Note wave bars on the northeast side of the Gavilan Range. Orange to red is the up part of the wave, green to blue is the down part.