

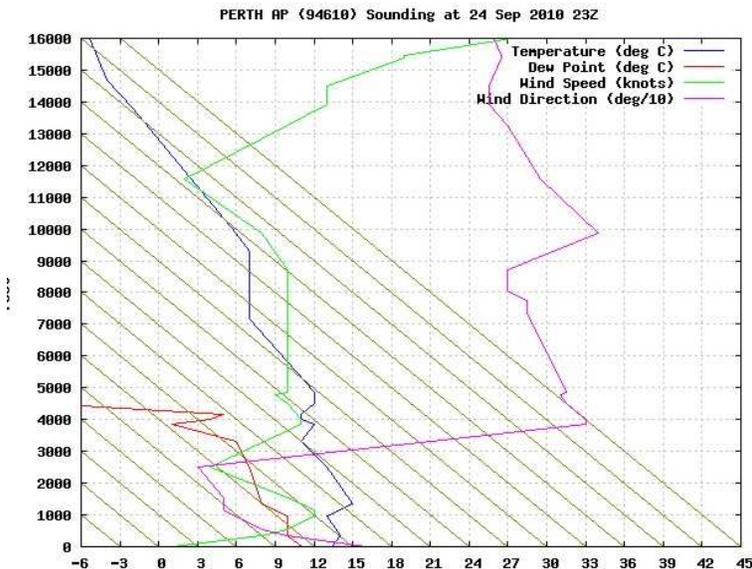
Wave influence on cross country flights.

Many people would not expect to encounter wave during cross country flights over the wheat belt. I believe that I would expect to have wave influence during about five flights per year. So what creates wave influence and how does it effect our flight.

Wave can be created by wind sheer in or above the convection zone. So if we look at the temperature trace at briefing we should also look at the wind direction, not only to see where the air is coming from but also to see if it will create any other effects. So let's look at a day, Saturday the 25th. The trace is shown below.

The temperature for the day was going to go to about 27-29° so the thermals should be going to 5-7000 ft. however there are two clues that there will be some issues over and above the normal thermal climb.

If we look at the blue temp trace line we will see that it starts to do strange things between 3 – 5000ft strangely lying back at more than the dry adiabatic rate at just below 4000 ft, indicating highly unstable air there, however just above and below that it is stable as it leans from the bottom left to top right. This would normally indicate that once the thermals have the ability to go above 3500ft up to 5000 ft there will be a bit of a battle to climb through this region. Look out for the grey misty inversion layer to see if you have reached the thermal tops.



What is causing the problem can be seen if we look at the blue line that shows the wind direction, we see a gradual backing from 1000 – 2000 ft then a rapid backing to 4500 ft where the wind changes from 30° to 310° what this will do is set up a wave motion in the atmosphere.

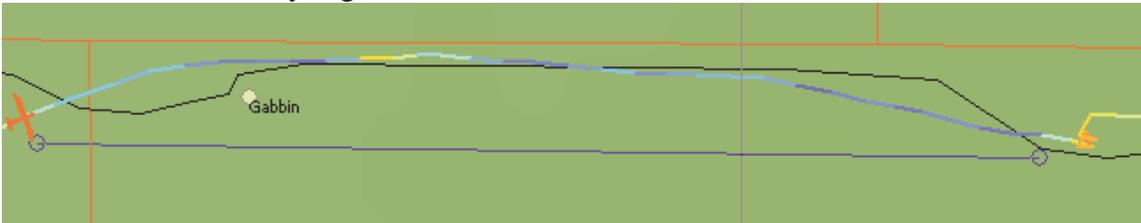
With these conditions you will get vast areas of lift but equally large areas of air that is sinking. So in the areas in the up side of the wave not only will all good thermal sources work well, but poor areas will work as well. In addition fling inter thermal there will be some nice areas of rising air, as if you were flying a street.

If we look at a section of my flight there are 6 single turns to find the thermal, the distance flown is 11 kilometres and the height gained is 1000 ft.



It is time to think that there is something happening with the air. Other things to give us clues that there is a wave influence is that the good thermals will be going to a height above the predicted height and also with a greater strength, 1 knot per 1000ft – 1 is a good rule of thumb. So if the thermals are going to 5000ft and the strength is 7-8 knots there could be wave. You may get clues from other pilots who give reliable indications of thermal strengths achieved.

So now let's look at my flight for the next 15 k 2000ft is lost.



Ok so I had a flight going West East and some was good and some was poor, you take the good with the poor. However in the above case I was crossing the wave bars that would have been running in a somewhat North South direction. The fun happens when the track changes. Normally when we hit sink when flying cross country we will go cross wind to find the lift street. However wave bars inevitably lie at a different angle to the wind, often 90°. Now with often horrendous sink we need to get out of it as soon as possible, we have to overcome our natural instinct to cross the thermal streets, and instead go cross wave, because if you don't you will be in a paddock. I have flown for 40k at times going cross street looking for lift and eventually finding a paddock.

There are I am sure a number of other things to consider but here is one. You get a nice climb to get final glide. Do you leave for home? I would be stacking up some height to get through the wave sink. And don't forget when you set off on final glide and you gain 1000ft on glide due to buoyant air, don't start pushing up the speed too early, because 10k from home with little height to play with you may end up in the sink part of the wave and you may end up with a dangerous final glide.

Additional comments

Only two weeks after writing this article we flew round the clubs. A similar wave effect was evident. I found that the first time I entered the buoyant air I was keen to take a

climb. However it proved better to push further into the buoyant zone to get the better climb. But it was also necessary not to push too far and take another run in sink.