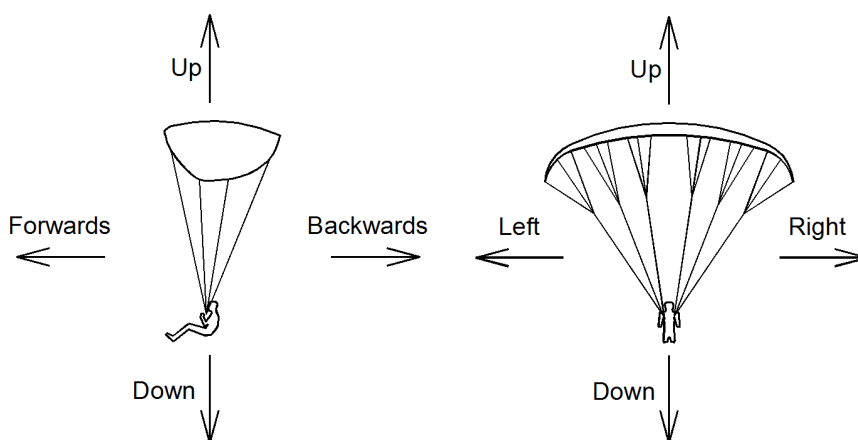


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Upwind, Downwind And Other Confusing Terms

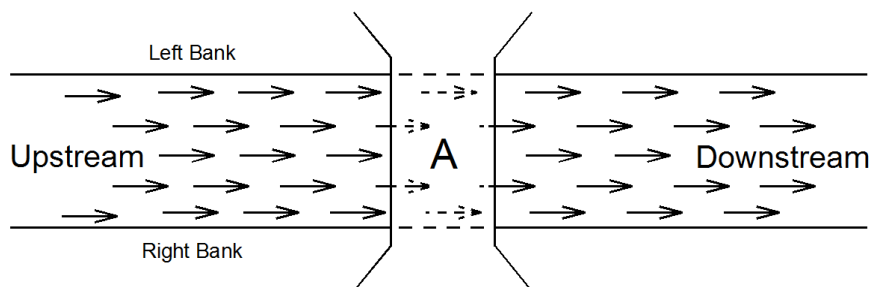
Some terms we use when flying originate from a long history of seafaring and do not adapt very logically for aviation. They can be rather difficult to understand if you have not come across them before. In particular, some pilots have difficulty getting the hang of “upwind” and “downwind”.

Let's have a look at how we normally think about direction. When we drive a car or sail a boat we only have to think about forwards, backwards, left or right. Flying we also have up and down.



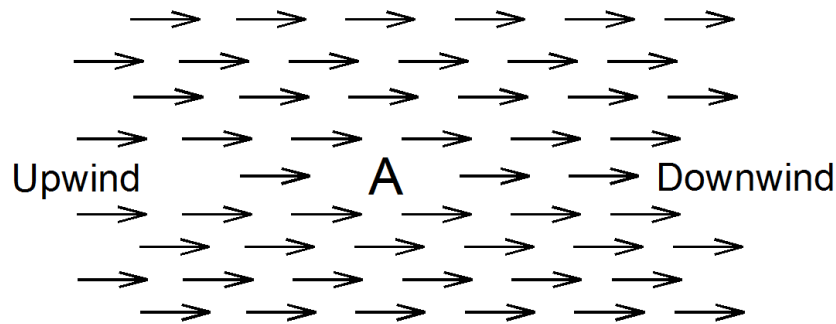
We can describe any direction as a combination of these. We could say something was forwards of us and up a bit, or forwards, up a bit and to the right. In the same way as we can move in any of six main directions air can too. Logically we would expect “upwind” to mean that air is moving upwards and “downwind” to mean that air is moving downwards. Unfortunately they don't! We will come back to this.

Let's be nautical and start by looking at a river seen from above.



If we stand on the bridge at “A” everything to the left is “upstream” of us and everything to the right is “downstream” of us. To play “Poohsticks” we would drop sticks into river on the upstream side of the bridge and see how long they take to appear on the downstream side. The water only flows horizontally in this river. It cannot flow up and down. Despite the use of the syllables “up” in “upstream” and “down” in “downstream” the water is really only moving horizontally and does not go up or down.

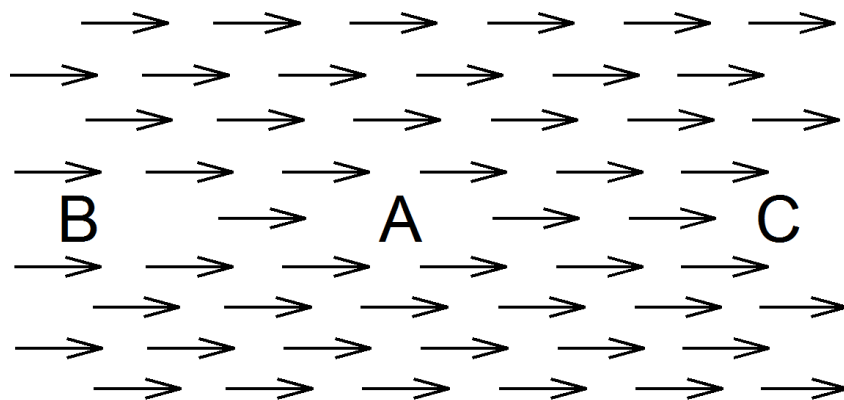
Now suppose we are standing in the middle of a large flat field in a wind. Looking down on the field from above, the air blowing across the field is rather like the water flowing along our river.



“Upwind” and “downwind” are very similar to “upstream” and “downstream”.

From where we stand at “A”, if we turn our face towards the wind we can say that we are facing upwind. If we turn our back to the wind we are facing downwind. Like the water in the river, the air is not actually going up or down.

We can now describe the position of something relative to the wind.



If we are standing at “A” we say that “B” is upwind of us and “C” is downwind of us. We would also say that we are downwind of “B” and we are upwind of “C”. A hunter will usually stalk his prey from the downwind side so that his scent is not blown towards the prey.

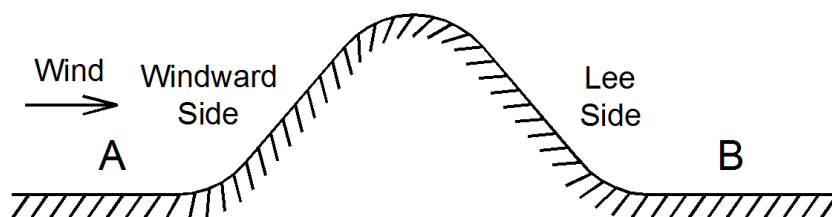
So, “upwind” and “downwind” are nothing to do with air going up or down. Moving upwind means moving against the wind or “into wind”. Moving downwind is sometimes also described as moving “with the wind”.

Windward, Leeward, Lee and Lee Side

After all that, you would think that describing the sides of a hill as “upwind” or “downwind” would do for everything in this respect. They probably would, but just to keep you on your toes the old sailors thought up some more. (Not much else to do on those long sea passages!)

“Windward” is the same as upwind and “leeward” is the same as downwind. Simple.

However, “lee” and “lee side” are two slightly more specialised terms. In the following diagram we could say that “A” is “windward” of the hill or “upwind” of the hill and both would be correct.



The downwind side can also be described as the “lee side”. “B” is downwind of the hill but, if it is in air which is significantly influenced by the presence of the hill, we say it is “in the lee” of the hill. Depending on the size and shape of the hill and weather conditions, air in the lee of a hill can be sinky, turbulent and rotory, or sheltered and becalmed.

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