

Trade Wind Surge

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- To start the topic I want you to visualize that air is a fluid and behaves in a similar way water does. Assume you have a beaker of water. If you pour it out straight down to a flat surface it splashes in all directions at once. An atmospheric analogy is a common phenomenon called microbursts. Nearly everyone has heard of what happens when a big Cb (cumulo nimbus cloud) suddenly dumps a tremendous burst of air straight down. The wind goes in all directions at once and the strength of the downflow can cause, and has caused aircraft to crash.
- Okay, put this aside for a minute and look at another experiment. If you're waist deep in water and flatten your hand vertically just below the surface of the water and move it rapidly from say right to left you'll quickly see you've created an eddy. Your moving hand has created a mini whirlpool.
- At this point we now we have the basics of a common occurrence in the Tropics, called the Trade wind surge. These surges are often seen when a strong Anticyclone forms to our south. Typically whenever a big High, usually over 1030 central pressure moves in, we cruisers in the Islands not only get a blast of reinforced trades but the wind is accompanied by cloud and often rain and squalls. Where does the cloud and rain come from?
- Lets assume you are in Fiji and the prevailing wind is a light to moderate E or ESE and at the same time a strong High moves east perhaps at 35 to 40 degrees south. At this point the isobars tend to compress creating a tighter gradient as this mountain of Air, which is another way of looking at an Anticyclone, moves to your south. As these stronger winds reach your latitude they are of course faster than the winds directly to your north. If we go back to our hand in the water analogy these winds create an eddy. The wind to the south creates what is known as cyclonic shear and as it tries to turn right it collides with the mild wind already there. At this point there is nowhere for the clashing air to go but up and that's exactly what happens. As the air ascends it reaches the dew point where cloud forms, and if the air rises high enough rain develops.
- Here is where the first analogy comes in. The one where we pour the beaker of water down to a flat surface. When the cloud builds air rises, but at the same time an equal amount of air returns to the surface. That is why we have lulls and gusts when cloud is about. The downflow wind strikes the surface of the ocean and spreads out. But the only direction that means anything is the direction toward the existing trade wind. These flows collide and again, the air has to go somewhere, so all that's left is up. The result of this is more cloud and rain. So now we can see how this becomes self sustaining.
- So that, in a nutshell, is the nature of Trade Wind Surges.