Understanding The Sky

Sport Pilots Weather by Dennis Pagen

Who would have thought that this masterpiece of sport flying condition knowledge could be improved. Well, the folks at Cross Country have done it. Dennis Pagen's original book with its basic black and white sketches, clear as they are and his understandable prose have been updated and enhanced with a modern full colour layout, hundreds of colour illustrations based on the originals and numerous superb colour photos, as well as benefiting from new editing, though text content and sections are practically the same.

The format is in Cross Country's semisoft gloss cover and quality binding which makes it cheaper and lighter than hardcover and more durable than the original soft cover. The size is about 15% taller and wider too.

This is a book you will go back to for revision and clarification as you learn the many aspects of flying weather. To help with that, it has a detailed contents, index and glossary. As before there are twelve chapters covering various subjects with each chapter containing sections of up to 20 subjects.

The pages are now in more easily readable text with the optimum 7 words per line in 2 columns, rather than the original 18 odd words per line. This helps you to read and recall if you are new to flying and there's many pearls of knowledge for experts too.

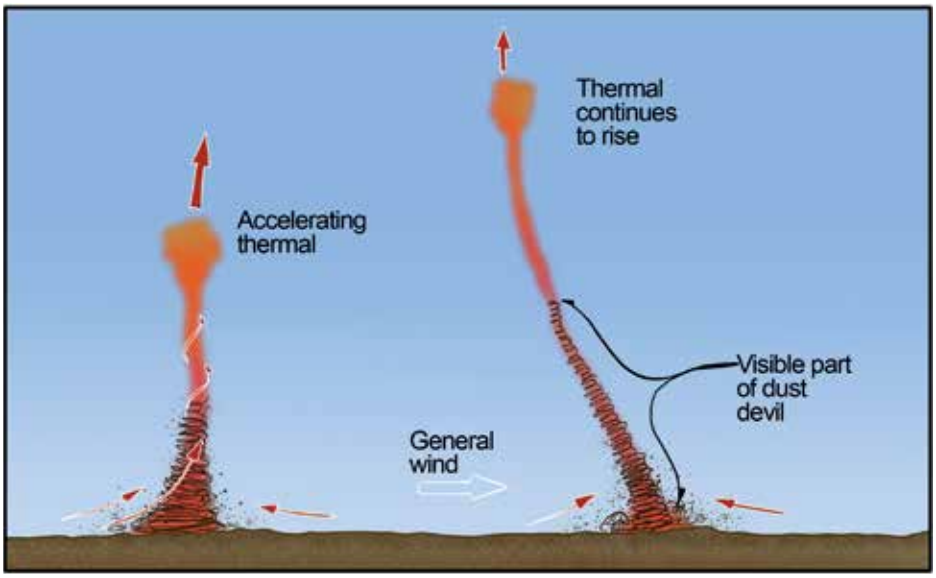
The book starts by explaining the global physics and moves onto more relatable subjects including; Clouds, Micrometeorology, Wind, Turbulence, Soaring Conditions, Thermals Thunderstorms and Forecasting. Included are many tips and examples from Pagen's own experiences.

Each chapter has a photo or two and the cloud chapter gallery has the most relevant examples. The numerous illustrations are an improvement on the originals, all are now in colour and many are as simple as the originals, even the newly detailed versions are clear in what they explain.

Understanding The Sky is a must for any paraglider, hang glider, balloon, sailplane, microlight and even fixed wing pilot. This version was published in June 2022 but due to demand, the book is in reprint already.

Available from flight retailers, schools and www.xcmag.com for £39.95 including shipping to NZ.

The following is an excerpt from the chapter on Instability and Thermals...



▲ FIG. 181: THERMALS CREATING DUST DEVILS
Dust devils occur when a thermal lifts off in supertadiabatic conditions.

DUST DEVILS

Tight cores of swirling wind will pick up dust, leaves and other debris to become a visible ground disturbance or towering column of brown dust in areas of bare ground. Such whirlwinds are known as willy-willies in Australia and dust devils elsewhere.

Dust devils occur when a thermal lifts off in superadiabatic conditions (see figure 181). The air rushing in to fill the area below the thermal usually has some turning motion due to the Coriolis effect if it has been flowing for some time. When this air comes together its spin is exaggerated just as a skater spins faster when his or her arms are brought in. This spinning air would soon lose its impetus except for the accelerating thermal "stretching" the air vertically and bringing the rotating column tighter as it gets higher, much like a column of thick syrup gets thinner as you pull the spoon out of it.

From the foregoing we can make a rule:

***Dust devils** are formed when thermals rise in a superadiabatic lapse rate. Dust devils lie under the rising thermal, mark its track, size and often height as well as duration.*

Dust devils sometimes reach up into a thermal cloud, but usually stop well below this level, being typically only several feet to several hundred feet high (up to 100 m). In some desert areas however, they can tower over several thousand feet (1,000 m) when fine dust and strong continuous thermals abound. In these areas the height of the dust devil will indicate the minimum height of the thermal as well as its duration. However, at times the dust devil lasts past the production of usable lift as many unhappy pilots diving for a devil have found out. Watching the climb altitudes and rates as well as the duration of dust devils helps you judge the duration of the thermals creating them.

From observation, the vast majority of dust devils turn counterclockwise in the northern hemisphere and clockwise in the southern hemisphere. Perhaps due to slight curvature of the flow due to the Coriolis effect. The few devils that turn in the opposite direction are probably artifacts of rotation that began through turbulence or moving past a bluff. There is some conjecture that dust devil action spins the thermal air, and indeed, rotating thermal clouds have been seen on rare occasions. It is likely that the air continues to spin above the dust although it probably stops its spin due to drag when the thermal leaves the superadiabatic layer. On this basis, it is reasonable to expect a better climb rate when turning against the flow of the dust devil (clockwise or to the right in the northern hemisphere) when in the strong lift of the superadiabatic layer. The reason for this better climb rate against the flow in spinning air is your rate of circling is slower so less bank angle is required to offset centrifugal force. Less bank angle gives you a better sink rate.