



Look for signs that foretell tomorrow's weather

BY BAYLOR FOX-KEMPER

What color is the sky?

T rue or false: Red sky at night, sailor's delight/Red sky in morning, sailors take warning? This is one popular weather aphorism that is grounded in hard facts about prevailing winds and light from the sun.

Because it is an equal mixture of all visible colors, ranging in wavelength from 0.75 (red) to 0.45 micrometers (blue), the sun's light is white. Some colors are scattered when light interacts with particles and gas molecules in the atmosphere.

If the sun's light interacts with particles that are smaller than all its wavelengths, shorter (bluer) wavelengths are scattered more strongly than longer (redder) ones. The sky appears blue on a cloudless day because the light has been scattered by small particles. On a hazy day, moist air will scatter out the blue light, giving the sun a yellowish tinge.

Clouds form from dust, ice crystals, or water droplets, which are larger than the wavelength of light and scatter all colors equally. Since light doesn't change color when it is reflected off clouds, the clouds will appear to have the same color as the light that hits them.

When the sun is rising or setting and is near the horizon, its light travels through more of the atmosphere than when it is overhead at noon. The blue is removed from the light we see then, and the long wavelengths—reds and yellows—remain. A red sunrise or sunset oc-

curs because the sky is clear in the direction of the sun. However, if clouds overhead and in the opposite direction reflect the red light, the sky can appear red in all directions.

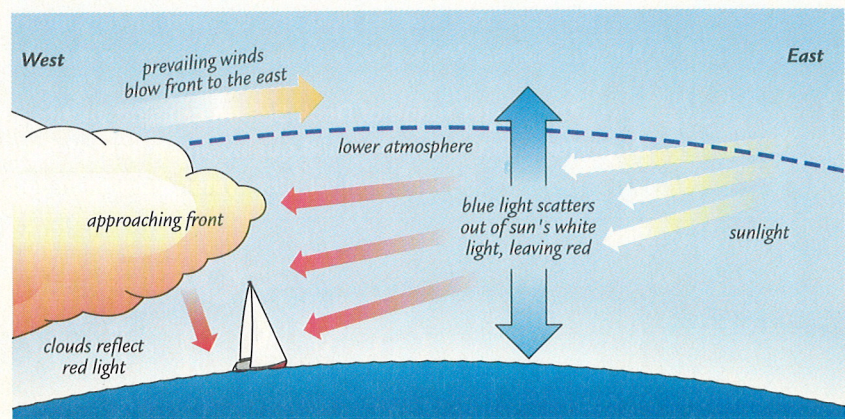
In the mid-latitudes the prevailing winds blow from the west. So if the sky is red when the sun is setting, it's because the clouds are receding to the east—a sailor's delight. A red sky in the morning, when the sun is rising, indicates that there are no clouds to the east, but that there are clouds, and perhaps a frontal system, approaching from the west (see figure).

There are significant exceptions. A major storm may create its own

geostrophic path and not arrive via the prevailing winds; a mid-latitude hurricane, for example, often approaches from the east. And not every part of the world has prevailing westerly winds. In the trade-wind belt, for example, the wind blows from the easterly quadrants. So if you're sailing in the trades, you have to reverse the couplet: Red sky at night, sailors take fright; red sky at sunrise, sailor's most prized.



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A red-sky sunrise in the mid-latitudes may occur because a frontal system is approaching from the west. A red sunset would occur if the skies overhead were clearing, with clouds moving away to the east