

THE ATMOSPHERIC RESERVOIR

Examining the Atmosphere and Atmospheric Resource Management

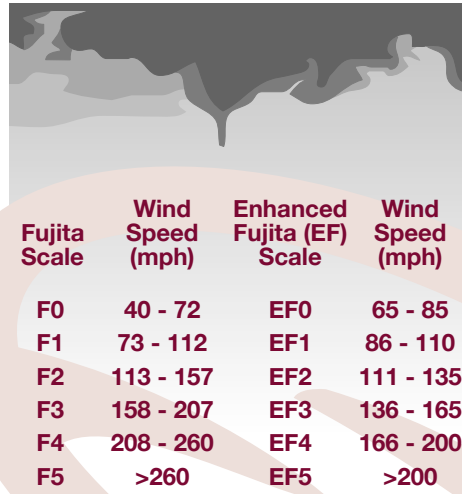
Fujita. . . Enhanced

By Daniel Brothers

In 1957, a deadly tornado struck Fargo, N.D. This tornado became the focus for research by Dr. Ted Fujita that would result in a tornado rating system called the Fujita Scale in 1971. In developing the Fujita Scale, Dr. Fujita estimated the wind speeds in tornadoes, and then tried to estimate the damage that would be caused by winds of that magnitude on various buildings and objects, such as trees. Therefore, the Fujita Scale is really a damage scale.

Over the years since the Fujita Scale was developed it has become apparent that some modifications needed to be made. The damage estimates in the Fujita Scale are confined to only a few different structures and types of buildings, and it does not factor in the quality of their construction. These shortcomings were resulting in an overestimation of wind speeds in stronger tornadoes.

In 2001 the National Weather Service (NWS) set out to create a rating system that could more accurately assess damage and assign wind speeds to tornadoes, and the result is the Enhanced Fujita Scale, or EF Scale. The new EF Scale has a wider range of structures and objects that can be used in rating a tornado, and it makes adjustments for construction quality. In all, there are 28 different Damage Indicators (DI), and each indicator has between 3 and 12 Degrees of Damage (DOD) associated with them. A DI could be anything from an old barn to a high



Fujita Scale	Wind Speed (mph)	Enhanced Fujita (EF) Scale	Wind Speed (mph)
F0	40 - 72	EF0	65 - 85
F1	73 - 112	EF1	86 - 110
F2	113 - 157	EF2	111 - 135
F3	158 - 207	EF3	136 - 165
F4	208 - 260	EF4	166 - 200
F5	>260	EF5	>200

rise office building, or even a light pole or tree. Degrees of Damage range from the first signs of damage to the complete destruction of the DI. A panel of experts was asked to give their best estimate for what wind speed would be required to cause each DOD, and their estimates became the wind speeds for the EF Scale. This resulted in slightly higher wind speeds for EF0 tornadoes and lower wind speeds for EF3, EF4, and EF5 tornadoes when compared to the Fujita Scale.

The assessment of the new EF Scale is quite a bit more complicated than the rather simplistic Fujita Scale, so the NWS developed what they call the EFkit for damage surveyors to use when examining tornado damage. This kit includes pictures and descriptions of every DI and DOD, which can be used to compare with the damage observed, which should help create more consistency in tornado ratings across the country.

The NWS also wanted a system that could be easily understood by the public and would preserve the usefulness of the historical database of tornadoes. To accomplish this, the EF Scale rates all tornadoes on a scale of 0 to 5, just like the Fujita Scale. Experts compared the damage caused by historical tornadoes over varying strengths to the new DIs and DODs in the new EF Scale and assigned the new ratings accordingly. This means that any tornado that caused F5 damage under the Fujita Scale would be assigned a rating of EF5 under the EF Scale, even though the associated wind speeds have been reduced in the new scale, maintaining the continuity of the database.

The NWS began operational use of the new EF Scale on Feb. 1, 50 years after the deadly F5 tornado that ripped through Fargo. Additional information on the implementation of the EF Scale can be obtained on the Storm Prediction Center website at www.spc.noaa.gov/efscale/. Information regarding the 1957 Fargo F5 tornado and the events planned for June 20, in commemoration of the 50th anniversary of this event can be obtained through the Grand Forks NWS website at www.crh.noaa.gov/fgf/.

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