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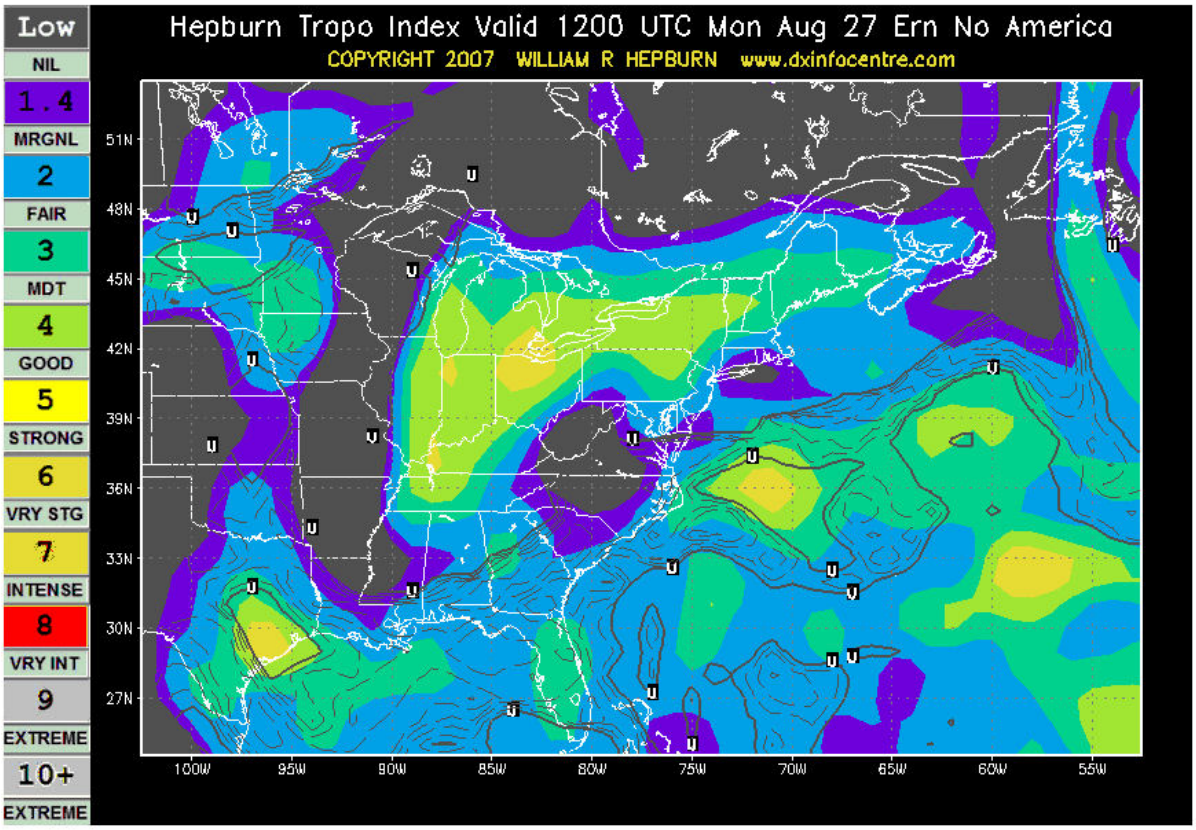
TROPOSHPERIC DUCTING FORECASTS

The troposphere is the lowest portion of the earth's atmosphere, extending from the earth's surface to approximately 4 to 12 miles above it (varying by location and season). Under certain conditions (discussed below) FM radio and TV signals in the VHF and UHF frequency bands can propagate over great distances through the troposphere due to a phenomenon called *tropospheric ducting*. A Canadian meteorologist and self-avowed radio/TV "DX" (long-distance) enthusiast, William R. Hepburn, has developed a method for predicting tropospheric ducting and provides forecasts (available on the Internet) using this method, which predict radio and TV signal strength propagation as a result of the ducting phenomenon.

"William Hepburn's Worldwide Tropospheric Ducting Forecasts" are available online at www.dxinfocentre.com/tropo.html. The principal content on this Website is the forecast maps—six-day preview as well as 42-hour preview (in 6 hour increments) maps for virtually every region of the world are provided (an example map of Eastern North America is shown here). The purpose of these maps is to display potential duct paths for VHF, UHF and microwave signals, indicated by the color shading on the maps using the "Hepburn Tropo Index" (see scale on the left-hand side of the map). This index indicates the degree of tropospheric bending forecast to occur over a particular area, which is an indication of the overall tropospheric radio signal strength on a linear scale from 0 to 10 (with 10 representing an "extremely intense opening" for propagation by ducting). Also shown on the maps (indicated by the letter "U") are predicted "unstable signal areas" where weather conditions could potentially disrupt signal paths and cause unusual and sometimes rapid variations in signal strengths.



Mr. Hepburn's Web page also provides some background information on ducting, indicating that vertical boundaries between different types of air masses (for example, warm air over cooler air) can refract radio signals. When the vertical boundary becomes especially sharp, the amount of refraction can become so severe that signal propagation is extended a great distance as though caught in a duct, thus the reference to tropospheric ducting.

The raw data for the maps (temperature, humidity & pressure) are extracted from the Meteorological Service of Canada's global weather model. Mr. Hepburn has written a proprietary algorithm which approximately mirrors the atmospheric conditions necessary to produce tropospheric ducting (warm dry air overriding cool moist air). He developed this algorithm from over 30 years of real-time distant radio & TV observations coupled with 25 years experience as a meteorologist. Using a freeware meteorological program called GrADS, the data is ingested, the algorithms are applied, and the maps are produced.

According to Mr. Hepburn, in the U.S., the Gulf States & Florida are most susceptible to ducting, especially during the spring months when the sea temperatures are still relatively low. In the Midwest, Great Lakes & Northeast, ducting is more common in the fall. Ducting is rare west of the Rockies except along the Pacific Coast & Hawaii.

The ducting forecast Web page is just one of the sites featured on "William Hepburn's Radio & TV DX Information Centre" Website (www.dxinfocentre.com), which also includes information on radionavigation, worldwide broadcast station lists, and a collection of "TV DX photos" showing screen shots of distant TV signals (as far as 1,000 miles away) received by Mr. Hepburn in Grimsby, ON, Canada (located about 50 miles NW of Buffalo, NY).