Electronic Atlas of WOCE Hydrographic and Tracer Data Now Available

PAGE 45

During the last decade, as part of the World Climate Research Programme, the World Ocean Circulation Experiment (WOCE) produced a global set of hydrographic, nutrient, and tracer data of unprecedented quality and quantity. Large parts of this data set are now publicly available and are being used for general oceanographic research and climate studies. However, widespread use of the combined WOCE data set is hampered; the data reside in many separate data files and the file format is complex.

To facilitate the use of the global WOCE data set, all data released by the WOCE Hydrographic Programme (WHP) have been compiled into an integrated data set when used with the Ocean Data View visualization software for Windows, this data set constitutes an "Electronic Atlas of WOCE Data" (eWOCE) that permits graphical display and interactive analysis of the data in many different ways. With extensive interactive controls such as user-defined plot configuration, zooming, auto-scaling, color adjustment, and station/sample selection, this electronic atlas complements and supersedes printed atlases that are now in preparation.

More than 200 property distributions along WHP sections are provided with eWOCE. Starting from these template plots, users can easily produce arbitrary property/property plots, distributions on general isosurfaces, property difference distributions between repeats, time-series plots, geostrophic velocity sections, and many other plot types. With eWOCE, the data can either be presented as colored shaded and/or contoured fields or as colored symbols or numbers at the measurement locations.

In addition to the measured, basic variables, a large number of derived variables can be calculated and analyzed. The WOCE data collection can be extended easily. Data from the World Ocean Atlas 1994, the World Ocean Database 1998, and other popular data formats can be imported without modification. As add-ons, eWOCE comes with a gazetteer of WOCE sections and the General Bathymetric Chart of the Oceans (GEBCO) gazetteer of undersea features, which allow easy identification of sections and topographic features. In addition to research applications, eWOCE can be useful for teaching and training.

For more information on eWOCE, see Web site: http://www.vagou.org/eos_elec/ 99258e.html.

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FORUM

Renaming D Double Prime

PAGE 46

"Knowledge about the dynamics of the D double prime region is a key to unlocking some fundamental mysteries of the Earth's heat engine which governs a wide range of global geophysical processes from tectonics to the geodynamic. This benign sentence makes complete sense to many geophysicists. But for many others, it all makes sense except, for the odd nomenclature "D double prime." One knows about the crust, upper and lower mantle, outer and inner cores, but where is the D double prime region? What meaning does it convey? Where is the D prime region, or the D region, or the A, B, and C regions for that matter, and are there higher-order primes? How did such an odd name come about anyway?

D double prime—or put simply D''—is a generic designation given to the thin shell, about 200 km thick, of the lowermost mantle just above the core-mantle boundary inside the Earth. Incidentally, whether D'' is "simpler" than "D double prime" depends on whether you are pronouncing it (or writing typing it); and D'' can be confusing to readers in distinguishing quotation marks (such as in the above sentences) and second derivatives and to word processors in spell checking and indexing.

So how did the name originate? It all started in the early 1960s when Keith E. Bullen (1906-1976; see AAS, 1979) was concentrating on the problem of the Earth's radial density profile. He found it convenient to divide the Earth into concentric layers according to their elastic properties, and used the nomenclature A through G for this purpose (Bullen, 1942; see also Bullen and Bolt, 1985, p.317). For example, the A region represents the crust, B the upper part of the upper mantle, and E and G the outer and inner core, respectively. The bulk of the lower mantle was named the D region, corresponding to depth of 2800-2900 km. Bullen (1950) further subdivided the D region into the D'' and D''' regions, following then new constraints on the velocity gradient through these regions.

For some years this nomenclature served its purpose in seismological context, but has gradually lost its utility—all except the name D'' as the bottom boundary layer of the mantle because of its special geophysical significance. In fact, the D'' name stuck ever since and in recent years became standard among practitioners and students in the field of the deep structure of the Earth.

Should we continue the proliferation of this now non-inductive (not to mention odd, awkward, wargonist, and confusing) nomenclature? Can we be more responsible, more imaginative, and user-friendly? How about we call the D'' region the Bullen Layer? In so doing, rather than taking anything away from the originator, we pay tribute to the great seismologist, along with other well-known 'nakes' in seismology: Rayleigh and Love waves, Slichter and Stoney modes, Gutenberg-Richter scale, Jeffreys-Bullen table, Benioff-Wadati zone, Mohorovicic discontinuity, and Lehmann discontinuity.

In the same vein, Bullen's nomenclature called for a thin F region (not to be confused with the F region in the ionosphere) to represent the transition right above the outer core-inner core boundary. As we learn more about the interactions at this boundary, the F region would undoubtedly be due to receive more limelight. It would be appropriate to name it the Lehmann Layer after Inge Lehmann (1898-1989) who in 1936 first identified the existence of the inner core from seismic waves reflected from this layer. However, the nomenclature "Lehmann discontinuity" has already been used in the literature to indicate the base of an anisotropic layer beneath continents at near 220 km depth (e.g., Gaherty and Jordan, 1995).

As research scientists, we are also responsible for communicating to the broader scientific community educators, and ultimately the public who support us, and leaving a heritage to future generations. Let us not insulate ourselves in our narrow field of expertise. We owe this to them, as well as to ourselves.

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References