Glossary / Terminology / Abbreviations / Acronyms

<https://www.nioz.nl/files/afdelingen/DMG/Abbreviations_Acronyms.pdf>

<http://www.wmo.int/pages/prog/wcp/ccl/documents/wmo_list_abbreviations.pdf>

The following draft was assembled to assist in my reading of the Longhurst book. Any misstatement should probably be attributed to me. -FNC

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| AGW | Anthropogenic (manmade) Global Warming |
| AGW mitigation | works on a century (or couple of centuries) timescale |
| Albedo | Albedo: whiteness.  The proportion of the incident [sun] light or radiation that is reflected back into space by a surface, typically that of a planet or moon. |
| AMO | Atlantic Meridional Oscillation |
| anomalies in SAT and in SST data may represent responses to two quite different forcing mechanisms, and may have two quite different consequences for the heat budget of the planet that really should not be confused | Longhurst, page 78 |
| Anomaly, climate or climatic | An event not resulting from a known climate phenomenon and thus, not able to be modeled except as a special case. – Just speculating -FNC |
| BEST | Berkeley Earth Surface Temperature project <http://berkeleyearth.org/> |
| **BP** | Before Present (BP) years is a time scale used mainly in geology and other scientific disciplines to specify when events in the past occurred. Because the "present" time changes, standard practice is to use **1 January 1950** as commencement date of the age scale, reflecting the fact that radiocarbon dating became practicable in the 1950s. The abbreviation "BP", with the same meaning, has also been interpreted as "Before Physics"; that is, before nuclear weapons testing artificially altered the proportion of the carbon isotopes in the atmosphere, making dating after that time likely to be unreliable. |
| Climate Prediction | An estimate of future climate under natural conditions |
| Climate Projection | an estimate of future climate under the assumptions of future human related activities such as socioeconomic and technical developments |
| Climate Response | … isn't just about radiative balance, heat capacity etc. Another key factor is Albedo… |
| Climate Sensitivity | Climate sensitivity (?T2X) of a molecule or particle. In the context of radiative forcing in the troposphere or stratosphere, measured in W m-2. In the context of total effect on global warming, this is usually expressed as the effect on atmospheric temperature of a doubling of the initial concentration of agent x. measured as a change in °K or °C. There must be a certain time period here. Maybe 100 years?? Anybody know what it is?   In recent decades the *temperature* based computation of the Climate Sensitivity attribute of a GHG has yielded to the more fundamental *W m-2* based notion of aggregate radiative forcing attribute of a GHG. |
| Climate Sensitivity | See ECS and TCS. From Tom Curtis@366 we have: |
| Climate Sensitivity, CO2 | See ECS and TCS.  You might have thought that good agreement would by now have been reached on the specific warming effects of radiative gases and aerosols on the temperature of the atmosphere, but much uncertainty remains. Longhurst’s reading of the literature suggests to him that not all those people who write about the projected consequences of increasing anthropogenic CO2 understand the simple fact that the effect of radioactively - active gas molecules in the atmosphere is not linear. In the case of CO2 because the main 14.9 micron absorption band of CO2 was already naturally saturated in the atmosphere prior to industrialization, so that the consequence of adding further CO2 to the atmosphere is proportional to the natural logarithm of the fractional change in concentration. Further, the most appropriate value for the consequences of doubling CO2 concentration remains uncertain and there has been much discussion since early estimates were proposed in the range of 1.5-­-4.5K; the AR4 of the IPCC used a value of 2.8 (2.2-­-3.8). Some of the higher values that have been proposed in the past cannot now be reconciled with paleoclimate evidence, and the most recent estimate that he has seen suggests a rather lower climate sensitivity of 1.7-­-2.6K. |
| Closed System | A climate system for which every part is accessible to anthropogenic alteration (remediation specifically) of climate change. (Just guessing! –FNC) |
| Cloud Radiative Forcing | Not to be confused with Radiative Forcing. |
| Current TSI | Current TSI (sometimes still called 'the Solar constant' even though we now know it isn't actually constant) is about 1361 W/m^2. The Maunder Minimum ~1700 was less than 1 W/m^2 lower. Thus, the most profound swing in TSI of the past several thousand years was a change of less than 0.1%. The difference from peak to valley of the ~11 year cycles is also about 0.1%, but obviously maintained over a shorter period.  Over longer time scales TSI is increasing by about 0.1% per ~140,000 years as the Sun grows older and hotter. |
| Diel | Diel vertical migration, also known as diurnal vertical migration, is a pattern of movement used by some organisms, such as Copepods, living in the ocean and in lakes. The migration occurs when organisms move up to the epipelagic zone at night and return to the mesopelagic zone of the oceans or to the hypolimnion zone of lakes during the day. The word diel comes from the Latin dies day, and means a 24-hour period. It is referred to as the greatest migration in the world in terms of biomass. |
| Earth System Sensitivity (ESS) | by their own definition works in millennial timescale |
| Equilibrium Climate Sensitivity (ECS) |  |
| Forcing | A cause or contributing factor which in conjunction with all other forcings, and in proportion to their several relative strengths, determines a climatic result (such as the sky to be blue or global warming. (Just guessing –FNC) |
| Forcing, Radiative | A forcing whose mechanism is electromagnetic radiation. (As opposed to, say, convection.) |
| GCM | Global Climate Model |
| GHCN, GHCND | GHCND (Global Historical Climatology Network)-Monthly Summaries is a NOAA database that “[addresses the critical need for historical monthly temperature, precipitation, and snow records over global land areas](http://www1.ncdc.noaa.gov/pub/data/cdo/documentation/GHCNDMS_documentation.pdf)”. “The values are derived from the GHCN-Daily database which is a composite of climate records from numerous sources that were merged and then subjected to a suite of quality assurance reviews.” This data covers the entire 20th century and involves more than 40,000 weather stations distributed across all continents. |
| GHGs | Greenhouse gasses mono-­-atomic molecules (O2 and N2) comprising the bulk of the atmosphere are transparent both to incoming solar and outgoing thermal radiation while the radiatively-active (“greenhouse”) gases are those whose molecules are excited to a higher energy level when impacted by a photon within one or more characteristic wave bands. This energy is then re - emitted almost instantaneously as the molecules return to their low. .energy state, thus increasing the temperature of the atmosphere and so radiating some energy back to space. These gases are all bi-­- atomic (CO2, CH4, H20, and so on), although industrially-­-produced complex molecules, such as the CFCs, may also be radiatively active.  Each GHG molecule has a characteristic longevity in the atmosphere, ranging from 7-­-9 days in the case of water vapour to 30-­-95 years in the case of CO2. |
| GISTEMP | <http://data.giss.nasa.gov/gistemp/tabledata_v3/ZonAnn.Ts+dSST.txt> |
| GLC | Changes in the Lengths of Glaciers. |
| GMSL | Global Mean Sea Level |
| GSMT | Global Mean Surface Temperature over land and sea |
| GSMT index |  |
| Gt | Gigatonnes ? |
| Global Warming Potential (GWP) | a measure of the total energy that a gas absorbs over a particular period of time (usually 100 years), compared to carbon dioxide.   * Carbon dioxide (CO2) has a GWP of 1 and serves as a baseline for other GWP values. CO2 remains in the atmosphere for a very long time - changes in atmospheric CO2 concentrations persist for thousands of years. * Methane (CH4) has a GWP more than 20 times higher than CO2 for a 100-year time scale. CH4 emitted today lasts for only about a decade in the atmosphere, on average.[3] However, on a pound-for-pound basis, CH4 absorbs more energy than CO2, making its GWP higher. * Nitrous Oxide (N2O) has a GWP 300 times that of CO2 for a 100-year timescale. N2O emitted today remains in the atmosphere for more than 100 years, on average.[3]   Chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs), hydrochlorofluorocarbons (HCFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF6) are sometimes called high-GWP gases because, for a given amount of mass, they trap substantially more heat than CO2. |
| HadCRUT4 | http://www.cru.uea.ac.uk/cru/data/temperature/HadCRUT4-nh.dat |
| IPCC | The UN General Assembly of the International Panel on Climate Change. Mandate: “to assess…the scientific basis of risk of human - induced climate change, its potential impacts and options for adaptation and mitigation”. |
| insolation | Incoming sunlight minus albedo. See also TSI. |
| IPPC | International Plant Protection Convention |
| ISTI | International Surface Air Temperature Initiative |
| K | Degrees Kelvin. See Climate Sensitivity. |
| Kyoto Protocol Gas | A GHG with high Climate Sensitivity. Specifically, carbon dioxide CO2, methane CH4, nitrous oxide N20, hydrofluorocarbons HFCs, perfluorocarbons PFCs and sulphur hexafluoride SF6. |
| NAO | North Atlantic Oscillation |
| NMAT | night marine temperature |
| OHC | Ocean Heat Content |
| ppm | Parts per million |
| PSW | Pacific summer water |
| PETM | [The Paleocene-Eocene Thermal Maximum](https://en.wikipedia.org/wiki/Paleocene%E2%80%93Eocene_Thermal_Maximum) |
| Pychnocline | [The cline or layer where the density gradient (∂ρ⁄∂z) is greatest within a body of water.](https://en.wikipedia.org/wiki/Pycnocline) |
| Radiative Balance | The sum or other combinative melding of **all** radiative forcings under consideration. |
| Forcing (or Radiative Forcing) | is given the following [definition by the IPCC](http://ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_AnnexIII_FINAL.pdf):  "Radiative forcing is the change in the net, downward minus upward, radiative flux (expressed in W m–2) at the tropopause or top of atmosphere due to a change in an external driver of climate change, such as, for example, a change in the concentration of carbon dioxide or the output of the Sun."  "See above then continue:  Sometimes internal drivers are still treated as forcings even though they result from the alteration in climate, for example aerosol or greenhouse gas changes in paleoclimates. The traditional radiative forcing is computed with all tropospheric properties held fixed at their unperturbed values, and after allowing for stratospheric temperatures, if perturbed, to readjust to radiative-dynamical equilibrium. Radiative forcing is called instantaneous if no change in stratospheric temperature is accounted for. The radiative forcing once rapid adjustments are accounted for is termed the effective radiative forcing. For the purposes of this report, radiative forcing is further defined as the change relative to the year 1750 and, unless otherwise noted, refers to a global and annual average value.  Radiative forcing is not to be confused with cloud radiative forcing, which describes an unrelated measure of the impact of clouds on the radiative flux at the top of the atmosphere." |
| SAT | [Land] Surface Air Temperature (Longhurst) |
| SAT | Satellite Activities (Office, WMO) per the WMO List of Abbreviations  And Acronyms (!) |
| SAT over land surfaces | Surface Air Temperature (Longhurst) |
| SST | Sea Surface Temperature; most importantly, as will be discussed below, SST is sensitive to changes in vertical motion in the upper ocean such as occurs during changes in wind-­-driven coastal upwelling. The consequences of changed upwelling intensity will be recorded as changes in the global surface temperature record although they have nothing to do with changes in temperature over land surfaces forced by changing radiative conditions in the atmosphere. This confusion appears not to have been addressed. Longhurst p 89 |
| SST | Sea Surface Temperature |
| These are all Cloud Cover Archives | EECRA, ERBE, ISCCP, & HIRES. See Longhurst p 111. |
| These are all Large-scale atmospheric patterns | (NAO, AMO, PDO, and SOI, all defined by atmospheric pressure difference between two distant points) |
| These are all Major Climate Indices | AMO, ENSO and so on. |
| TOA energy flux | Top of Atmosphere energy flux or net downward energy flux at the Top of the Atmosphere |
| Transient Climate Response (TCS) | the [IPCC definition](http://www.ipcc.ch/publications_and_data/ar4/wg1/en/annexessglossary-a-d.html) of Transient Climate Response states: *"The transient climate response is the change in the global surface temperature, averaged over a 20-year period, centred at the time of atmospheric carbon dioxide doubling, that is, at year 70 in a 1% yr–1 compound carbon dioxide increase experiment with a global coupled climate model. It is a measure of the strength and rapidity of the surface temperature response to greenhouse gas forcing."* |
| Transient Climate Sensitivity (TCS) |  |
| TSI | Total Solar Irradiance. See also Insolation and Current TSI. |
| UAH |  |
| UHI | Urban Heat Island |
| USCHN |  |
| W m-2 | Watts per square meter. Also shown as W/m2 or as W.m-2. The preceding sign, sometimes omitted, shows directionality.  **Plus is warming**: energy transfer downward from space into the atmosphere, downward through the atmosphere ( stratosphere or troposphere particularly), downward into the surface air, or on into the earth’s surface.  **Minus is cooling**: energy transfer upward out of the earth’s surface and on to outer space. |
| W.m-2.yr-1 | Watts per square meter per Year |