BLIPMAP Prediction Parameters and Description

BLIPMAP = Boundary Layer Information Prediction MAP

NB: The atmospheric Boundary Layer (**BL**) is the vertical region above the surface within which air has been mixed by thermal or windshear eddies, i.e. the region where glider pilots normally fly.

THERMAL PARAMETER FORECASTS:

Thermal Updraft Velocity (W*)

Average dry thermal updraft strength near mid-BL height. Subtract glider descent rate to get average vario reading for *cloudless* thermals. Updraft strengths will be stronger if convective clouds are present. W* depends upon both the BL depth and the surface heating. MoreInfo

Buoyancy/Shear Ratio (B/S)

Dry thermals may be broken up by wind shear and unworkable if B/S ratio is 5 or less. If convective clouds are present, the actual B/S ratio will be larger than calculated here. [This parameter is truncated at 20 for plotting.] MoreInfo

Height of Boundary Layer Top (TI=0 height)

Height of the average dry thermal tops, or Thermal Index TI=0 height. *Over flat terrain* maximum thermalling heights will be lower due to the glider descent rate and other factors. However, thermal tops will be higher over small-scale topography not resolved by the model and some pilots have reported that in elevated terrain the heights they can reach over local terrain features correspond better with the BL Top than with Hcrit. In the presence of clouds the thermal top will increase, but the maximum thermalling height will then be limited by the cloud base (see the "Cloud prediction parameters" section below). Further, when the mixing results from shear turbulence rather than thermal mixing this parameter is not useful for glider flying. [This parameter is truncated at 22,000 for plotting.] MoreInfo

Height of Critical Updraft Strength (Hcrit)

This parameter estimates the height at which the average dry updraft strength drops below 225 fpm and *over flat terrain* is expected to give better quantitative numbers for the maximum *cloudless* thermalling height than is the traditional BL Top (TI=0) height given above, especially when mixing results from wind shear rather than thermals. (Note: the present assumptions tend to *under*predict the max. thermalling height.) In the presence of clouds the maximum thermalling height may instead be limited by the cloud base (see the "Cloud prediction parameters" section below). [This parameter is truncated at 22,000 for plotting.] MoreInfo

Thermal Height Variability

This parameter estimates the variability (uncertainty) of the BL top (TI=0) height prediction which can result from meteorological variations. Specifically, it gives the expected increase of the BL Top if the actual surface temperature is 4 °F warmer than forecast. Larger values indicate greater variability and thus better thermalling over local "hot spots" or small-scale topography not resolved by the model. But larger values *also* indicate greater sensitivity to error in the predicted surface temperature, so actual conditions have a greater likelihood of differing from those predicted. MoreInfo

WIND PARAMETER FORECASTS:

Wind Speed in the Boundary Layer

The speed of the *vector-averaged* wind in the BL. This prediction can be misleading if there is a large change in wind direction through the BL (for a complex wind profile, *any* single number is not an adequate descriptor!). MoreInfo

Wind Direction in the Boundary Layer

The direction of the *vector-averaged* wind in the BL. This prediction can be misleading if there is a large change in wind direction through the BL (for a complex wind profile, *any* single number is not an adequate descriptor!). Note that there will be a abrupt artificial gradient at the "cross-over" between 0 and 360 degrees. MoreInfo

Wind Shear in the Boundary Layer

The magnitude of the *vector* wind difference between the top and bottom of the BL. Note that this represents *vertical* wind shear and does *not* indicate "shear lines" (which are *horizontal* changes of wind speed/direction). MoreInfo

BL Max. Up/Down Motion (BL Convergence)

Maximum grid-area-averaged *extensive* upward or downward motion within the BL as created by horizontal wind convergence. Positive convergence is associated with local small-scale convergence lines (often called "shear lines" by pilots) - however, the actual size of such features is much smaller than can be resolved by the model so only stronger ones will be forecast and their predictions are subject to much error. If CAPE is also large, thunderstorms can be triggered. Negative convergence (divergence) produces subsiding vertical motion, creating low-level inversions which limit thermalling heights. This parameter can be noisy, so users should be wary. MoreInfo

CLOUD PARAMETER FORECASTS:

Cumulus Potential

This evaluates the potential for small, non-extensive "puffy cloud" formation in the BL, being the height difference between the surface-based LCL (see below) and the BL top. Small cumulus clouds are (simply) predicted when the parameter positive, *but it is quite possible that the threshold value is actually greater than zero for your location so empirical evaluation is advised.* I would be interested in receiving end-of-season reports on what threshold value worked for your site. Clouds can also occur with negative values if the air is lifted up the indicated vertical distance by flow up a small-scale ridge not resolved by the model's smoothed topography. [This parameter is truncated at -10,000 for plotting.] MoreInfo

Cumulus Cloudbase (Sfc. LCL)

This height estimates the cloudbase for small, non-extensive "puffy" clouds in the BL, *if such exist i.e. if the Cumulus Potential parameter (above) is positive or greater than the threshold Cumulus Potential empirically determined for your site*. The surface LCL (Lifting Condensation Level) is the level to which humid air must ascend before it cools enough to reach a dew point temperature based on the surface mixing ratio and is therefore relevant only to small clouds - unlike the below BL-based CL which uses a BL-averaged humidity. However, this parameter has a theoretical difficulty (see "MoreInfo" link below) and quite possibly that the actual cloudbase will be higher than given here - so perhaps this should be considered a *minimum possible* cloudbase. I would be interested in receiving end-of-season reports on how well this parameter worked for your site. [This parameter is truncated at 22,000 for plotting.] MoreInfo

OverDevelopment Potential

This evaluates the potential for *extensive* cloud formation (OverDevelopment) at the BL top, being the height difference between the BL CL (see below) and the BL top. Extensive clouds and likely overdevelopment are predicted when the parameter is positive, with overdevelopment being increasingly more likely with higher positive values. Overdevelopment can also occur with negative values if the air is lifted up the indicated vertical distance by flow up a small-scale ridge not resolved by the model's smoothed topography. [This parameter is truncated at -10,000 for plotting.] MoreInfo

OverDevelopment Cloudbase (BL CL)

This height estimates the cloudbase for *extensive* BL clouds (OverDevelopment), *if such exist, i.e. if the OverDevelopment Potential parameter (above) is positive*. The BL CL (Condensation Level) is based upon the humidity averaged through the BL and is therefore relevant only to extensive clouds (OverDevelopment) - unlike the above surface-based LCL which uses a surface humidity. [This parameter is truncated at 22,000 for plotting.] MoreInfo

BL Max. Relative Humidity

This parameter provides an additional means of evaluating the formation of clouds within the BL and might be used either in conjunction with or instead of the other cloud prediction parameters. Larger values indicate greater cloud probability, but use of this parameter must be empirical since no theoretical guidance is available - for example, pilots must determine by actual experience the percentage that correlates with formation of clouds above local mountains. The cloud base height is not predicted, but is expected to be below the BL Top (TI=0) height. MoreInfo

CAPE

Convective Available Potential Energy indicates the atmospheric stability affecting *deep* convective cloud formation *above* the BL. A higher value indicates greater potential instability, larger updraft velocities within deep convective clouds, and greater *potential* for thunderstorm development (since a trigger is needed to release that potential). Note that thunderstorms may develop in regions of high CAPE and then get transported downwind to regions of lower CAPE. Also, locations where both convergence and CAPE values are high can be subject to explosive thunderstorm development. MoreInfo

FUNDAMENTAL BL PARAMETER FORECASTS:

Boundary Layer Depth

Depth of the layer mixed by thermals. This parameter can be useful in determining which flight direction allows better thermalling conditions when average surface elevations vary greatly in differing directions. (But the same cautions mentioned under "Height of BL Top" also apply.) It is also an important determinant of thermals strength (as is the Surface Heating). MoreInfo

Surface Heating

Heat transferred into the atmosphere due to solar heating of the ground, i.e. the heating that creates thermals. [This parameter is truncated at -100 and +1000 for plotting.] MoreInfo

Surface Temperature *CurrentDay* *Current+1*

This model-predicted surface temperature can be compared to the actual temperature at 2m during the day to evaluate the accuracy of model heating predictions.

Experimental

The parameter displayed here varies, often being one used for testing.

NAM-MODEL-ONLY PARAMETER FORECASTS:

Surfacs Sun

Solar radiation reaching the surface. This indicates a "degree of cloudiness", which is dependent upon cloud depth as well as sky cover fraction, since clouds are principally responsible for radiation not reaching the surface. Comparison to the "Surface Heating" parameter indicates the solar radiation fraction which is transferred into heating the atmosphere.

Total Cloud Cover

Total cloud cover in percent. DrJack has his doubts about the usefulness of this parameter since very thin high clouds can produce a "100% cloud cover" even though considerable solar radiation still reaches the surface.