



What's New in FLOWSTAR 7.1.4?

June 2011

Since the last general release of FLOWSTAR 7.1.2 in February 2004 there have been a significant number of model developments and improvements. This document summarises the new features and other changes. For further details of the new features, please see the latest version of the FLOWSTAR User Guide that accompanies the model. The ADMS complex terrain technical specification paper (P14/01O/09), available from CERC, gives a detailed description of the stable flow field algorithms.

Major Changes

1. The maximum number of data points that may be included in a *.ter* file and a *.ruf* file has been increased from 5,000 to 16,500.
2. The critical Froude number, below which the stable flow field algorithms are used, has been increased from 1 to 1.5. The purpose of this change was to improve FLOWSTAR's flow field predictions for cases where the Froude number is between 1 and 1.5.
3. The neutral stability regime is now modelled using a different stratification case (an inversion at boundary layer height with stable layer above and well-mixed layer below). This change may affect the flow when the hill height is comparable with the inversion height in neutral conditions.
4. The minimum flow field output height has been changed to be 1.3 times the *maximum* surface roughness length in the *.ruf* file or 1.3 times the value of surface roughness in the Hills screen if a constant value of surface roughness is used. (Previously 1.3 times the *minimum* roughness was used.) If a height lower than this value is requested, no output will be given at that height. This is to prevent the possibility of flow field parameters being output for heights below the local roughness length.

Minor Changes

5. The compiler used for the FLOWSTAR model code has been changed. This means that results from all model runs will have changed slightly in comparison with FLOWSTAR 7.1.2.
6. Multiple instances of FLOWSTAR can now be run on the same PC. This should not have been attempted by users previously, as the temporary files created during the runs could have been used by the wrong model run.
7. Checks that the *.met* file is correctly formatted have been improved.
8. Improvements have been made to the calculation of flow and turbulence if spatially varying surface roughness is modelled (i.e. if a **.ruf* file is used).
9. Previously the model could crash if the terrain was not correctly resolved. Now, if the terrain is not correctly resolved, the model stops with an error message that offers the user helpful advice.
10. Previously the model may have had problems accessing temporary files if virus checker software was running. This may have caused the model to crash. Now, if the model tries to access a file but is refused by the system, it will try repeatedly for up to 15 minutes before stopping the run. During that time, messages are issued to the screen to warn users that virus-checking software may be causing problems.
11. In previous versions of FLOWSTAR, if spatially varying roughness was modelled and a met line had a wind direction of -999 (no valid data), but all other meteorological parameters were valid for this met line, the met condition was modelled with a wind direction of 81°; this was incorrect. This has now been corrected so that the met line will no longer be modelled if a wind direction of -999 is entered.
12. The meteorology output file **.mop* contains some new data:
 - a. The values of the (upstream) surface roughness at the terrain site (labelled Z0(DISP)) and at the met site (labelled Z0(MET)).
 - b. The input and output values of solar radiation (labelled K), in W/m^2

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