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RocPro3D - Release 6.2.1 - (2024/01/02)
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GENERAL BUG FIXES

- Crash when saving without a project open (FR language only).
- Crash when a decimation is followed by auto-intersection face correction or zone extraction.
- Reset of the distance map when extracting zones after a decimation.
- Delaunay meshing algorithm:
  • Correction for meshes based on contour lines,
  • Default tolerance value changed to 0.0 (previously 0.001).
- Locator:
  • Calculation of locator when importing a raster DTM, followed by mesh calculation,
  • Modification of recalculation strategy during various DTM editing operations.
- Trajectories/protections intersections:
  • In some rare cases, the baseline of 3D protections was not exactly lying onto the DTM.
    Some flying portions of trajectories could therefore not "see" the protection.

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RocPro3D - Release 6.2.0 - (2023/11/12)
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UI BUGS FIXES

- Corrected some MessageBoxes (FR) and some labels.
- Added hourglass cursor for CPU-intensive operations.
- Removal of hourglass when importing xyz files.
- Creation of lines (contours, sources, protections) in 2D view: check that at least 2 points
  have been entered. If not, the line is deleted.
- Update outer boundary when modifying topology.
- Automatic redisplay of points after mesh reset.
- Automatic de-display of points after mesh calculation.
- Display of 3D view with default viewpoint in the mesh editing dialog if 3D view was
  disabled in the main UI.
- When a trajectory is selected, the mass of the corresponding block displayed in the
  Analysis pane becomes equal to 0 (visual bug only).
- For protections defined according to NF P 95 308, the protection class was incorrectly
  incremented by 1 in the "Protection properties" dialog.
- In the Protection Analysis, the map/envelope profile units was [kJ] for all envelopes,
  and the figure title may have been incomplete.
- In the protections Analysis, the lock Protection button was not properly working for the
  reduced RAM strategy.

GENERAL BUG FIXES

- Crash during successive meshing operations (e.g. 2D Profile thickness changes).
- Crash when selecting, via the iterator in the Trajectories->Selected tab of the Analysis
  pane, of block trajectories without impacts (i.e. blocks in equilibrium with the specified
  initial conditions).
- Improved calculation of the intersection of trajectories with inclined protections:
  treatment of the special case of impacts located between the base line and the top line
  of the protection, which were not correctly "seen" by the protection.
- Points in the 2D profile with very close coordinates might not all be taken into account
  in the 2D mesh.
- When reopening a project, the position of the protections in the protection Profile view
  could show an horizontal offset (visual bug only).
- When using the referential NF P 95 308, the protection class was erroneously incremented
  by 1 in the "Protection settings" dialog.

NEW FEATURES
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1) UI
- Update of the online help link in the "About RocPro3D..." dialog.
- Update of the web link in "About RocPro3D..." dialog.
- When creating a new project, the DTM TOPO tab is now active by default (instead of the
  MAP tab).
- The information displayed in the status bar is updated either:

• continuously for models with fewer than 1e5 faces,
  • on a left mouse click for larger models.

2) DTM edition
- Displayed of DTM extent : Dx Dy Dz.
- Background image (if any) is now preserved after DTM edition.
- User-defined points of views (POV) are now preserved after DTM edition.
- DTM level curves settings are now preserved after DTM edition.
- Automatic selection of non-compliant faces after mesh consistency test, and display of
  these faces in the main 2D and 3D views.
- Addition of a button to force consistence of the mesh faces normals.
- Addition of a checkbox to display only selected faces (e.g. after DTM verification).
- Added tests to avoid irrelevant topology modifications when the model is already consistent:
  • Deletion of unused points,
  • Inversion of face normals,
  • Deletion of overhanging faces with self-intersections,
  • Removal of overhangs.
- Implementation of a random resampling method.
- Implementation of two mesh decimation algorithms:
  • Quadric Edge Collapse decimation (Surface Simplification Using Quadric Error Metrics,
    M. Garland & P. Heckbert, Proceedings SIGGRAPH 97),
  • DecimatePro (based on Decimation of triangle meshes, W. Schroeder, J. Zarge & W. Lorensen,
    Computer Graphics, 26, 2, July 1992).

3) Soils
- Deletion of the export/import of soil allocation via a smap file.
- Soil allocation export to a raster file added (soil raster import was already functional in
  the previous version).
- When the SOIL panel is active, a legend has been added in the 3D view, which describes, for
  each soil of the project, their color and their name.

4) Sources
- Reorganization of the source properties dialog to make it easier to read.
- Source entry (2D view): Enter key on numeric keypad, same as Enter (end of line).
- Possibility of defining an identical number of blocks for each source (see the Source
  Properties dialog).
- Import of sources from shapefile:
  • Import fix for import of unclosed POLYGON entities (now automatically closed).
  • Addition of ARC entites import.
- Source export now produces 2 separate files for each source, the first containing the 2D
  geometry (polyline points in 2D view), the second the complete 3D geometry (polyline
  points intersecting the DTM).

5) Protections
- Creation of protections (2D view): Enter key on numeric keypad, same as Enter (end of line).
- Import of protections from shapefile:
  • Import fix for import of unclosed POLYGON entities (now automatically closed).
  • Addition of ARC entites import.
- Exporting protections now produces 2 separate files for each protection, the first
  containing the 2D geometry (polyline points in 2D view), the second the complete 3D geometry
  (polyline points intersecting the DTM).

6) Run
- The following default calculation properties are modified:
  • Probabilistic formulation (previously deterministic),
  • Probabilistic variable enabled for initial block position (previously disabled).
- Added calculation end-time and project name to the summ file.

7) Analysis
- In the export file (.trajp) of the selected trajectory (see the
  Analysis->Trajectories->Selected tab), addition of global coordinates (X, Y) of the
  trajectory points and also those of the DTM profile.
- Addition of a color scale (3D view) when one trajectory is selected and the Profile view
  is displayed.
- More explicit legends for the map (3D view) of Energy classes and the map of P(Propagation)
  classes.
- Height reference point added to title (Profile view) and in the trajectories profile (Graph
  view).
- In the Graph view :
  • Correction of the right axis label (Cumulative frequency).
  • Graph legends can be added/removed (see the "Advanced display settings" menu/button).
- Adaptative font size (title, color scale, axes labels) with respect to display window size.
- Added the possibility to export experimental cumulative distributions (displayed in

the Graph view) onto .txt ascii files.

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1) Export of Files

1.1) Export of the selected trajectory (Analysis panel) :
- When exporting the selected trajectory, the file extension was incorrect. This is now fixed.

1.2) Export of statistical summaries (Analysis panel) :
- When exporting the statistics of the trajectories or the statistics of a protection, the
  operation could lead, in some cases, to a crash of the application. This is now fixed.

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Updates :
- Update from MSVC2010 to MSVC2017.
- Update from library Fox-1.7.60 to Fox-1.7.81.
- Update from library vtk5.10.1 to vtk6.1.0.
- Update from library curl-7.23.1 to curl-7.80.0.
- Integration of the Shapelib library 1.5.0.

1) UI (User Interface)

1.1) User interface :
- Modernisation of the user interface (see User's Guide for full details).

1.2) File saving :
- When saving files, an informative message is generalized in case the file cannot be saved
  (e.g. if the file or the directory is read-only mode, or if the target drive is full).

1.3) User interface :
- The unselection of selected objects when changing tabs is disabled. This should make it
  easier for the user to analyze trajectories and protections.

1.4) Graph view :
- Corrections applied to the default naming of files upon file printing (png image).
- The number of histogram classes is now adjusted by default according to the block number (N)
  of the analyzed population.

1.5) Definition of a default point of view (3D View) :
- It is now possible to change the default point of view (PoV) of the 3D view, by defining
  a user point of view.
- It is defined from the "3D Tools" groupbox :
  • The "Settings" button allows saving the current user point of view, or importing them from
    an existing RocPro3D project.
  • The choice list allows selecting the desired PoV.

2) DTM

2.1) Management of meshes with large coordinates :
- During certain operations (stl export and decimation) on meshes with large coordinates
  (typically greater than 1e6 m), a loss of geometry accuracy could be observed. This issue
  is now fixed.

2.2) Management of non-conforming meshes :
- Improvements made to the detection of non-conforming meshes (connectivity, 2-manifold
  character, absence of holes, absence of overhanging faces).
- Availability of a new tool for correcting meshes with overhangs, which removes all faces
  with at least one vertex under an overhanging area. The result is a mesh with holes,

which must then simply be rebuilt (first reset the mesh). An appropriate tolerance
(Delaunay) should be chosen.

2.3) DTM edition :
- During some DTM editing operations (resampling, zone extraction) carried out with previous
  versions (5.x.x), source and protection properties were lost. This has now been corrected,
  i.e. the source and protection properties are retained.
- Added a "Undo" feature when performing the following operations on the DTM :
  - Noising,
  - Smoothing,
  - Geometric transformation.
- Addition of 2D and 3D views in the DTM edition dialog.
- Calculation of the distance between meshes during an operation modifying the mesh, which
  makes it possible to quantify the error (in terms of signed distance) between the initial
  mesh and the modified mesh.

2.4) DTM level curves :
- The main and secondary level curves of the DTM computed from the DTM can be added to the
  2D and 3D views.
- They can be displayed or not via the checkboxes CN1 (main) and CN2 (secondary).
- The user can choose 5 interval patterns (CN1-CN2): 5-1m; 10-2m; 25-5m; 50-10m; 100-20m
  (see "Advanced Visualization Settings" dialog).

3) IMPORT OF SOILS, SOURCES AND PROTECTIONS

3.1) Import of soils, sources and protections from an existing RocPro3D project :
- It is now possible to independently import into the current RocPro3D project (rpro file)
  different types of objects used in another RocPro3D project (rpro file) :
  • All soils -only properties- (see button added in the "Soils" tab)
  • All sources -geometry (X,Y) and properties- (cf. "rpro" format added in the choice list
    of imported file types in the "Import sources" dialog box, accessible from the "Run" tab.
  • All the protections -geometry (X,Y) and properties- (see "rpro" format added in the list
    of choice of the imported file types of the "Import protections" dialogue box, accessible
    from the "Run" tab.

4) SOILS

4.1) Import of soils raster :
- It is now possible to import soils in raster format from an asc file.
- The asc file must contain, for each cell, the soil Id, following the usage made in the
  RockyFor3D software. Soils are then automatically created and assigned to the corresponding
  faces in the RocPro3D mesh.

4.2) Export/Import of the soil mapping :
- It is now possible to export soils allocation, and import it on a new DTM. This is useful
  when the DTM of a model whose soils were already assigned has been modified (mesh edition).

4.3) Choice of the dissipation model for Rn :
- In previous RocPro3D version (5.x.x), the dissipation model for Rn was a global property
  that applied for all soils (defined in the "Computation settingsé", see "Run" tab).
- From now, the dissipation model for Rn is defined for each soil (see dialog "Soils settings"
  in the "Soils" tab).

5) SOURCES

5.1) New block source positioning mode :
- In previous versions (5.x.x), the 3D position of the sources was calculated by a vertical
  projection of the 2D geometry (XY plane view) on the DTM.
- A new type of source is now available, whose 3D position is calculated by horizontally
  projecting their 2D geometry (XY plane view) onto the DTM. This makes it much easier to
  define source lines that follow the topography more realistically (because only few points
  have to be defined by the user).
  Thus, with this new type of source :
  • For source segments whose points are at the same altitude, the real source line (in the
    3D view) follows the contour line corresponding to this altitude.
  • For segments whose points are not at the same altitude, the altitude of the real source
    line (in the 3D view) varies linearly between the altitude of the 2 points.

- The type of projection is selected in the "Block source properties" tab (see the "Projection" drop-down list in the "Block source geometry" groupbox). By default, the old positioning mode (i.e. vertical projection) is activated.
- Notes on visualizing sources :
  • In the 3D view, it is always the actual geometry of the source that is displayed, after projection (vertical or horizontal) on the DTM, and it is this geometry that is used to define the starting points of the blocks.
  • In the 2D view, the source geometry is displayed :
    • If the trajectories/envelopes have not been calculated :
      • With solid line, as it was defined from the points entered by the user (with mouse), therefore without any projection. It thus looks unrealistic, but allows easily to add additional points if needed and/or to modify the source geometry.
      • With dotted line, representing the real geometry after projection (vertical or horizontal) on the DTM.
    • If the trajectories/envelopes have been calculated :
      • With solid line, representing the real geometry after projection (vertical or horizontal) onto the DTM.

5.2) Import of sources from shapefiles (ESRI format) :
- It is now possible to import sources from the shapefile format :
  • Geometries are defined in the couple of files *.shp and *.shx
  • Attributes (optional) are defined in the *.dbf file
- Remarks :
  • These 3 files must have the same "root" name.
  • Only geometries of POLYGON type are imported.
  • Attributes must have the following fields (order does not matter), corresponding to data used in RocPro3D :
    - ROCKDENSITY   (specific mass, in kg/m^3)
    - GEOMTYPE   (shape type of blocks : 0 = sphere ; 1 = disk)
    - DIAMETER   (diameter, in m)
    - HEIGHT   (height, in m - only for the disk shape type)
  • Attributes can also correspond to the data used in RockyFor3D :
    - ROCDENSITY
    - BLSHAPE
    - D1
    - D2
    - D3
    - RG70
    - RG20
    - RG10
    - SOILTYPE
    - Vol
    In this case, note that :
    - Values of RG70, RG20, RG10, SOILTYPE and Vol fields are not used in RocPro3D.
    - Parallelepiped and ellipsoid shapes are converted to spheres of equivalent volumes.

5.3) Creation of surfacic sources :
- Correction of the surface source lines, for which the update was not carried out at the time of their creation in interactive mode in the 2D view.

5.4) Export of sources and protections :
- It is now possible to export the 2D (X-Y) geometry of each source and protection on ascii files in txt format (see buttons added in the "Sources" and "Protections" groupboxes of the "Run" tab).
- This offers the possibility to use them in third party applications.

5.5) Properties of the sources of blocks :
- In the "Block source properties" dialog, it is now possible to specify globally a lineic or surfacic density of blocks. This allows, among other things, to avoid defining the number of blocks for each source.
- The total number of blocks sources for the current project has been added to the dialog (for information).

6) PROTECTIONS

6.1) New positioning mode for protections :
- In the same way as for the sources (see §5.1), the 3D position of the protections can be defined by a horizontal projection of the 2D geometry (instead of the vertical projection used in previous versions).
- The choice of the type of projection is made in the "Protection properties" tab (see

"Projection" drop-down list in the "Protection geometry" groupbox). By default, the old
positioning mode (i.e. vertical projection) is activated.

6.2) Import of protections from shapefiles (ESRI format) :
- It is now possible to import protections from the shapefile format :
  • Geometries are defined in the couple of files *.shp and *.shx
  • Attributes (optional) are defined in the *.dbf file
- Remarks :
  • These 3 files must have the same "root" name.
  • Only geometries of POLYGON type are imported.
  • Attributes must have the following fields (order does not matter), corresponding to
    data used in RocPro3D :
    - PROTTYPE   (0 : fictitious ; 1 : Net ; 2 : Embankment)
    - HEIGHT   (in m)
    - CAPACITY   (in kJ)

6.3) Inclination of the protections :
- In previous versions (5.x.x), the protections were vertical.
- An inclination can now be specified for all types of protections (fictitious, nets,
  embankments). Several choices are available to define the inclination :
  • Vertical (same as previous versions of RocPro3D)
  • Normal to the DTM: the protection is defined perpendicularly to the topography at the
    level of the protection baseline.
  • Angle: the protection is tilted downstream by the specified angle with respect to the
    vertical (value between 0 and 89°, 30° by default)
- The choice between the different types of tilt is made in the "Inclination" drop-down list
  (groupbox "Protection geometry") in the "Protection properties" dialog box).

6.4) Adding mixed starting conditions for block sources :
- It is now possible to specify both an initial speed and a drop height as starting conditions
  for the blocks.

6.5) Properties of the protections :
- The total number of blocks sources for the current project has been added to the dialog
  (for information).

6.6) Properties of the selected protection and stat file :
- The Q99 has been added to the protection parameters : drop-down lists, statistics tables
  and stat file.

6.7) Protections (ETAG 27) :
- For protections defined from ETAG 27, only the MEL properties were previously available.
- It is now possible, at the user's choice, to use the MEL or SEL protection properties.
  This choice must be made for each protection that is defined according to ETAG 27.

7) COMPUTATIONS

- Numerical optimization of calculations, which results in a significant improvement in
  the speed of calculations and user interaction, especially sensitive for large 3D models.

8) TRAJECTORIES

8.1) Export of trajectories :
- Exporting a trajectory to a *.traj file now also provides, in the same local reference frame
  as the trajectory, i.e. (L(X,Y),Altitude), the profile of the DTM as well as the geometry
  of any intersected protections.

9) ANALYSIS

9.1) Trajectories :
- In the graph view (located at the bottom right), the ability to view the histogram of
  distances (XY) reached by trajectories and of the trvel time have been added, with the
  possibility of filtering trajectories by sources.

9.2) Protections :
- In the view of graphs (bottom right view), possibility to visualise histograms of masses
  and volumes has been added.
- Visualization of the evolution of any statistical parameter (Max, Average, CL, Q...) of

the results (E, V, h...) on the protections, according to the number N of trajectories intercepted by the protection. This graph makes it possible to verify a posteriori the relevance of the result. This graph is called "Statistical Convergence".

9.3) Envelopes/Maps :
- Addition of new maps :
  • Map of number of originating cells NumTrajSrcCell (source cells) for trajectories of each cell.
  • Map of propagation probability (MEZAP 2022) + corresponding isolines.
  • Map of classes of propagation probability Classes-P(propag (i.e. propagation hazard).