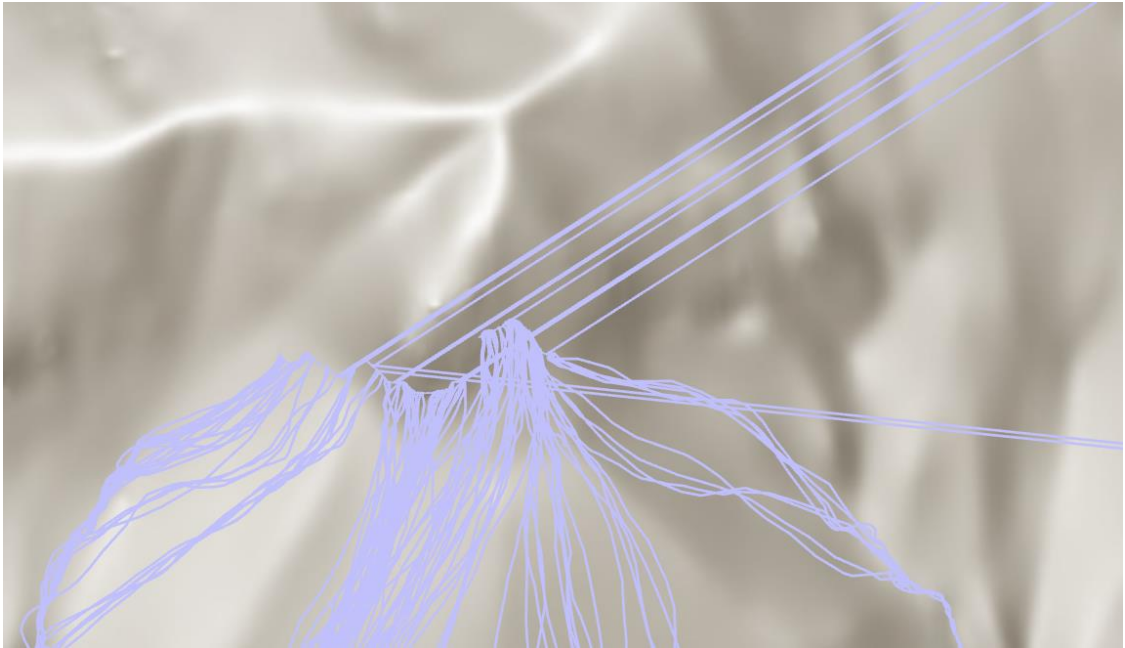


## RAMMS::ROCKFALL CHANGELOG

V 1.7.65 [2022-11-04]

- **Improvement: Trajectories-Shapefile improved:** For every simulated scenario, a polyline-shapefile (Name: "<scenario\_name>\_Trajectories.shp") with all the trajectories is created by RAMMS. If rocks stopped immediately at the release location, this trajectories-shapefile got corrupted, see image below:



This problem is now resolved!

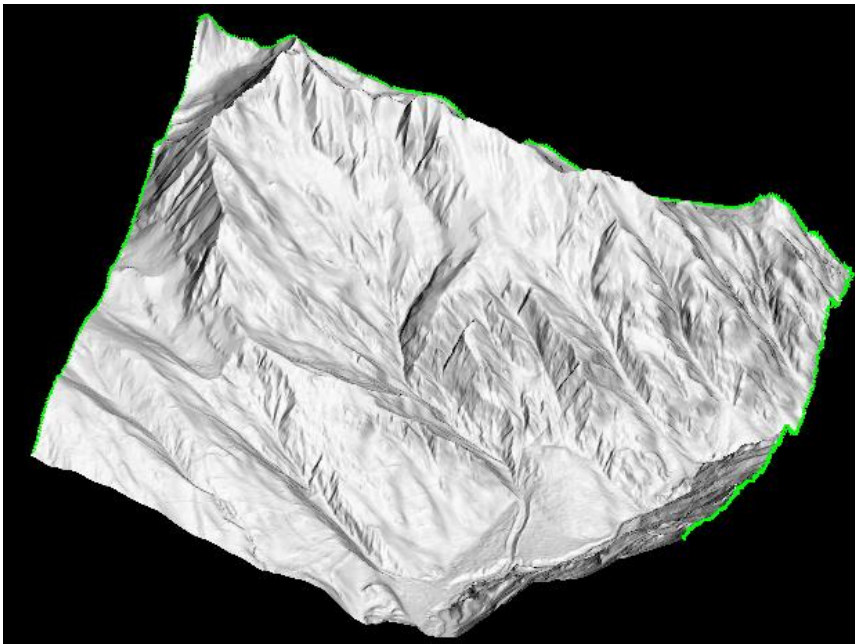
V 1.7.60 [2022-10-25]

- **New Feature: Hillshade Visualization:** Use "Extras → Create Hillshade Image" to create a hillshade image of your DEM.

Visualization of DEM Surface



Visualization of hillshade image



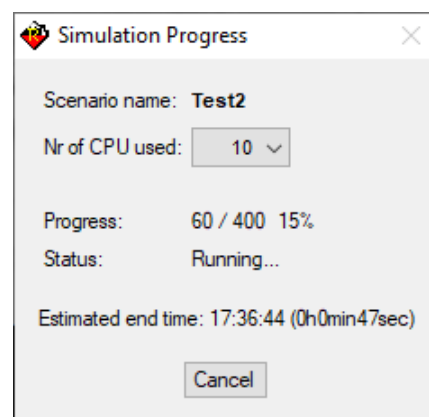
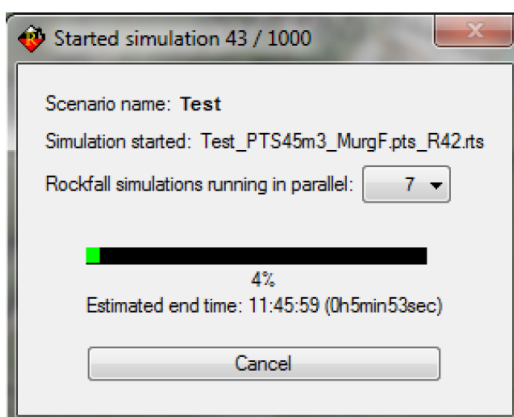
V 1.7.50 [2022-10-03]

Dear RAMMS::ROCKFALL users, this update is not yet the long-awaited new **scarring terrain-model update**. Nonetheless, this update contains some nice improvements (TIFF-DEM and -export, Rock-Builder), as well as some very useful new features (reduced output values, Reach Probability from shapefile, Impact-Analysis and a much faster handling of the topography-visualization), see details below. If you are interested in testing the **Beta-Version** of the new **Scarring-Model**, please contact us!

- **Improvement: TIFF DEM format** → Only ESRI ASCII grid DEM files were allowed in RAMMS::Rockfall. **NEW:** GEOTIFF DEM files can be used to create a new project. When creating a new project, the DEM was also saved as "dhm.asc" in the project folder. Similarly, slope angles and curvatures were saved as ASCII files. We changed these files to tif-files (faster to read/write, less disk memory).
- **Improvement: Convert irregular XYZ point file to raster** → Only regular XYZ data could be converted to an ASCII raster in RAMMS. **NEW:** Irregular XYZ points can be converted (LINEAR or INVERSE DISTANCE interpolation methods available) to a raster (TIFF or ASCII).
- **Improvement: Export results to TIFF-raster** → RAMMS could only export results to ASCII grid raster files. **NEW:** the default export format is GEOTIFF! If you want to export ASCII raster files, then you can set the **OUTPUT\_GRID\_FORMAT** keyword in the Add. Preferences:

`OUTPUT_GRID_FORMAT ASCII (ASCII or GEOTIFF)`

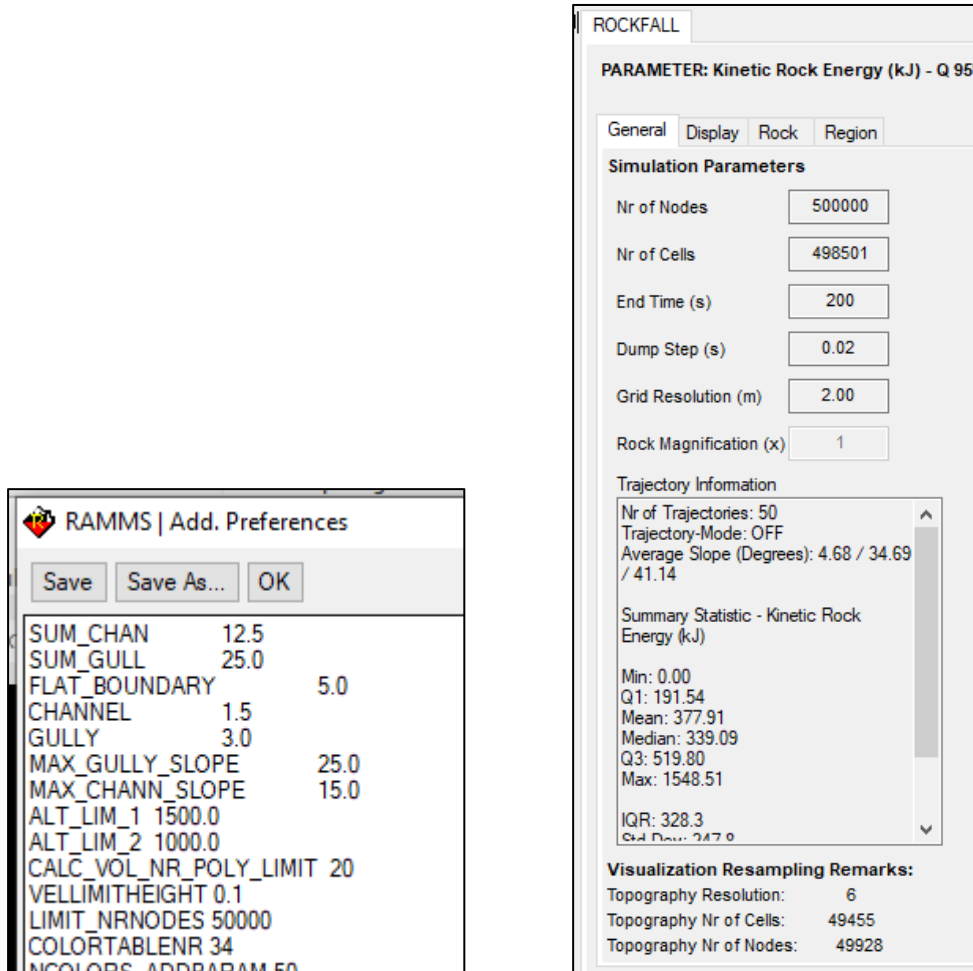
- **New Feature: Reach Probability Analysis from Shapefile** → Normal reach probabilities (Total and Source Reach Probability) are calculated on a grid cell basis. This can lead to lower values than expected. With this new feature it is possible to calculate a "Source Reach Probability" for a polygon region (Menu *Statistics* → *Reach Probability from Shapefile*).
- **Improvement: Simulation Performance** → Simulation Progress Window improved, such that simulations are performed faster.



Old simulation window (left) and simplified new progress window (right)

- **Improvement: Visualization handling improved** → Large project regions were very tedious to handle in RAMMS, because millions of grid cells were very slow to move, zoom and rotate. Even drawing shapefiles was a very slow process. The max nr of visualized grid nodes can now be set in the **"Additional Preferences"** (keyword **LIMIT\_NRNODES**). The default are 50'000 grid

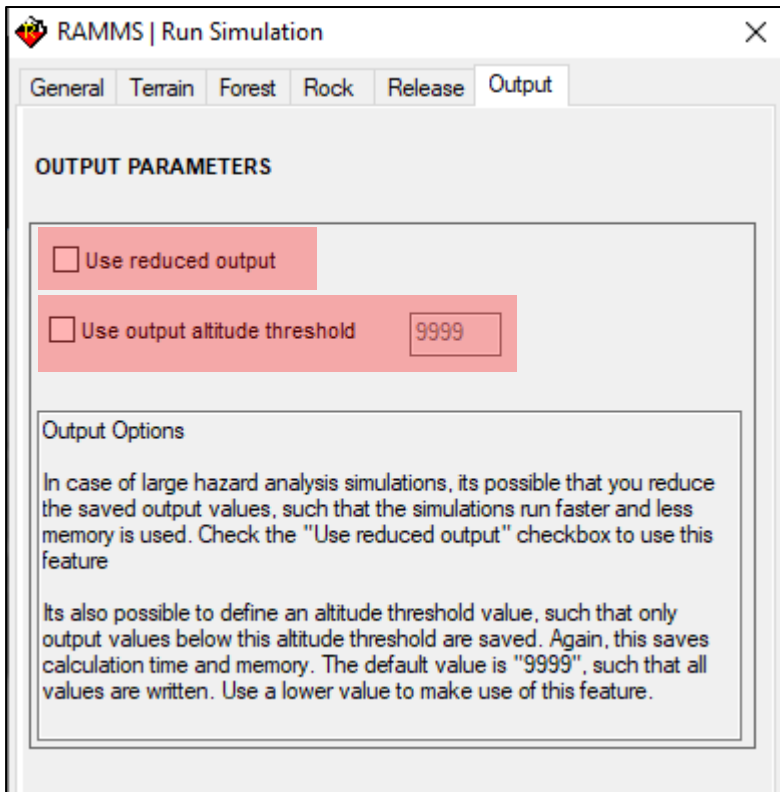
nodes, which is a good value from experience. RAMMS will then interpolate your topography such that this condition is met (in *Input- and Output-Mode!*). This has no influence on the simulation grid resolution! Unfortunately, in *Trajectory-Mode*, this only helps if you do not open too many trajectories. The more trajectories you open, the slower moving/zooming/rotating your topography will get.



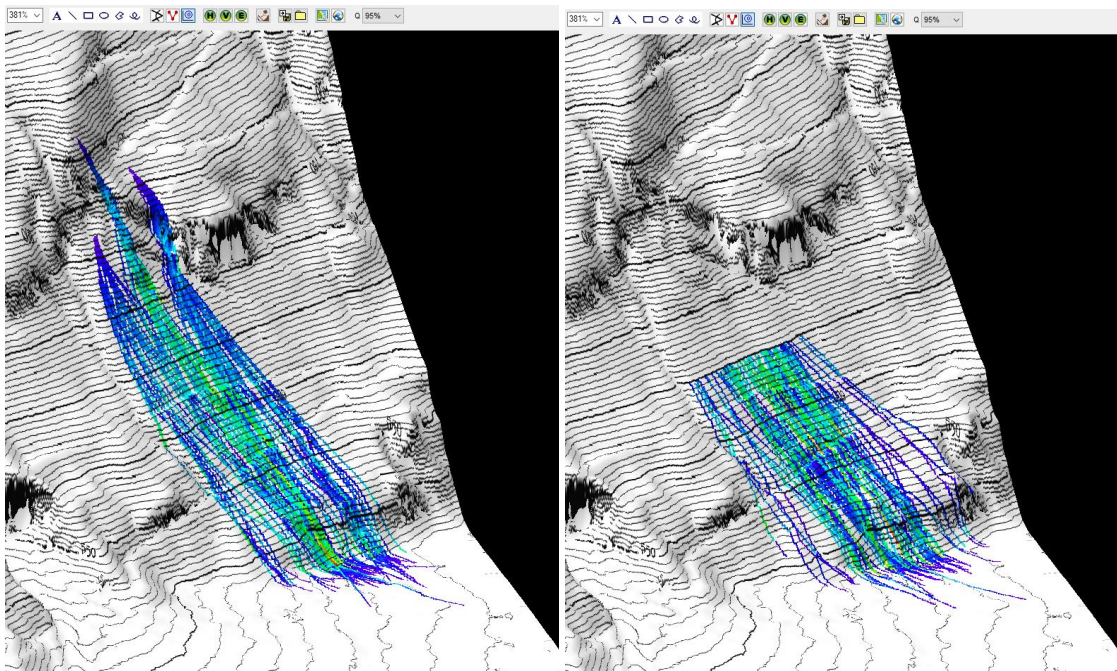
Left: Add. Preferences with **LIMIT\_NRNODES** keyword. Right: Information about **original** grid nodes/cells (1) and **resampled** nodes/cells (2)

- **New Feature: Reduced Output-Values and Altitude-Threshold** → In case of large hazard analysis simulations, it's possible to **reduce the saved output values**, such that the simulations run faster and less disk memory is used. Check the "Use reduced output" checkbox to use this feature. Beware: These simulations **cannot** be opened in Trajectory-Mode! It's also not possible to open scenarios with "normal" output-values and "reduced" output-values together. Reduced output-results are: Jump height, kin. energy, nr. of rocks, nr. of deposited rocks and reach probabilities (total and source).

It's also possible to define an **altitude threshold value**, such that only output values below this altitude threshold are saved. Again, this saves calculation time and disk memory. The default value is "9999" (all values are written). Use a realistic altitude value to make use of this feature.

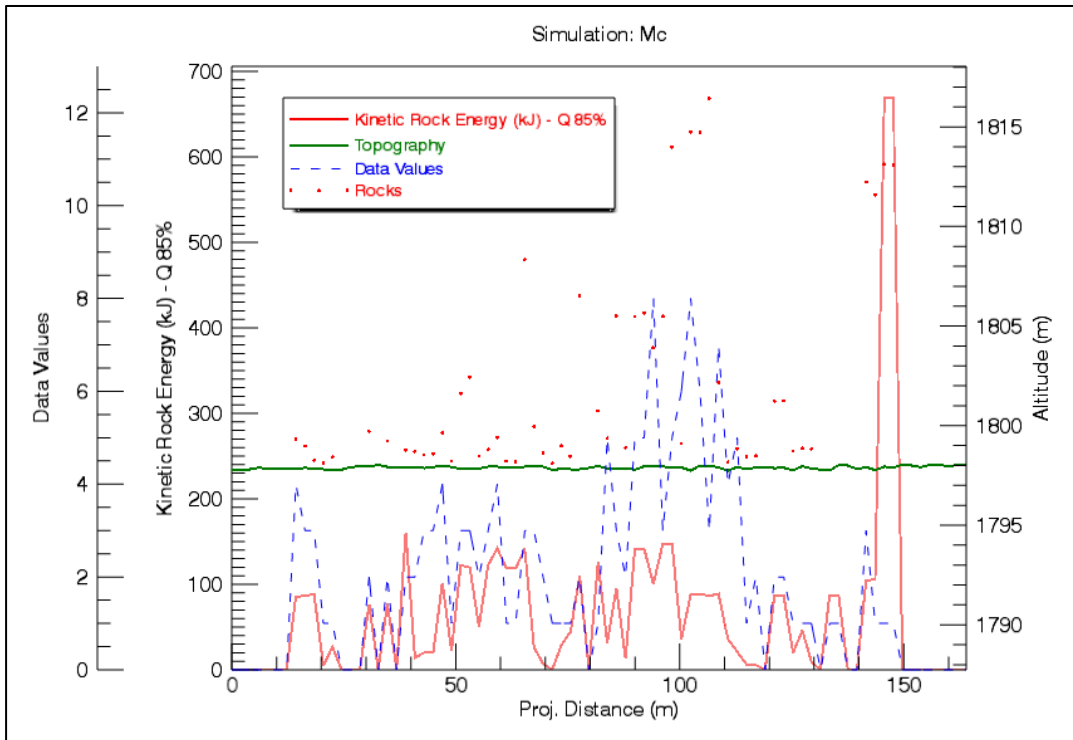


Reduced output and altitude-threshold value



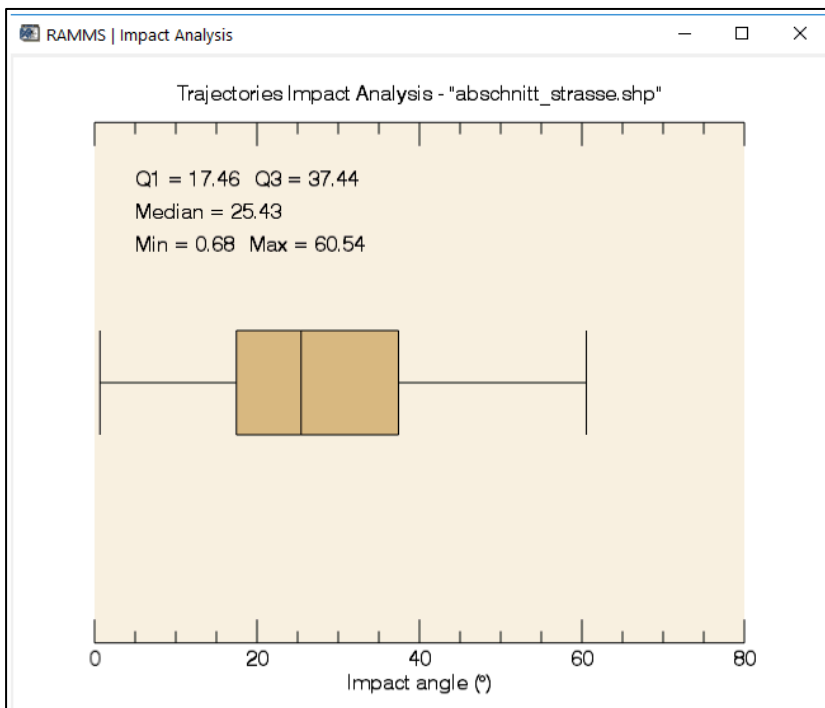
Left: "Normal" output, and with altitude threshold of 650m (right).

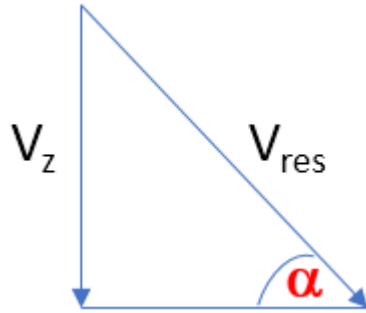
- **Bugfix: Improved Line-Profile** → Small bug in case line shapefile runs out of project region. Resolved. Additionally, we improved the line profile plot:



Blue dashed line represents nr of data values, and red points are jump heights of rocks.

- **New Feature: Trajectory Impact-Analysis from Shapefile** → This feature can be used to analyse rock impacts on flat areas, e.g. galleries, roads, dams, etc.
  - draw a polygon shapefile where you want to analyse impacts
  - Choose "Extras → Trajectory Impact-Analysis from Shapefile" and select above shapefile
  - the following plot will then show impact angles in degrees:





Calculation of impact angle  $\alpha$ .

Additionally, two txt-files are saved in your scenario-directory:

- "impact\_data.txt" and
- "impact\_trajectories.txt"

"impact\_data.txt":

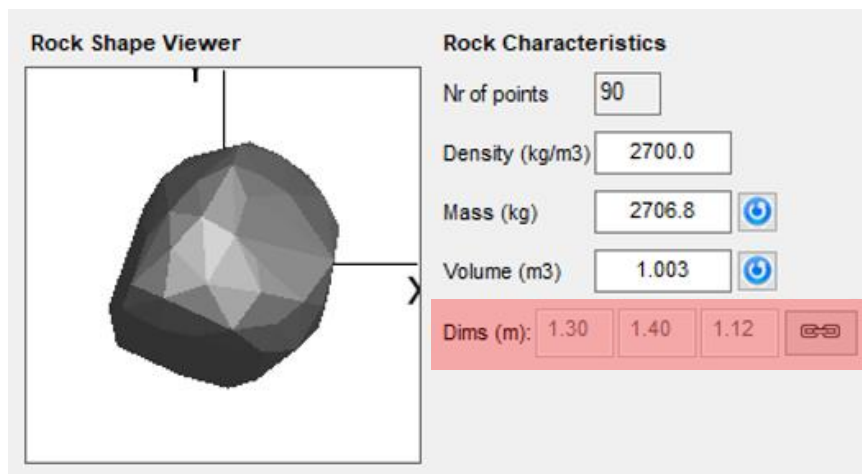
This file contains details of every trajectory impact (impact time and location, kin. Energy, velocities and impact angle). The first entry "i" is the index-value into "impact\_trajectories.txt".

i	t (s)	X (m)	Y (m)	Z (m)	Ekin (kJ)	Vx (m/s)	Vy (m/s)	Vz (m/s)	Vres (m/s)	Angle (°)
0	35.300	778061.97	145328.14	1798.17	21.02	5.19	-9.15	-2.64	10.85	14.08
1	49.961	778083.54	145348.46	1798.19	3.72	3.33	-2.33	-2.51	4.77	31.75
2	33.881	778078.86	145340.24	1798.41	83.93	5.29	-14.35	-18.00	23.62	49.65
3	35.763	778065.73	145333.59	1798.26	35.12	4.58	-13.05	-5.15	14.76	20.43
4	61.304	778076.88	145350.41	1799.02	10.40	4.00	-5.87	-4.72	8.52	33.60
5	61.501	778078.55	145346.55	1798.44	29.92	7.26	-8.94	-8.12	14.09	35.20
6	32.102	778069.55	145322.85	1797.22	117.79	3.89	-19.19	-18.07	26.64	42.70
7	34.042	778086.22	145351.55	1798.21	2.68	2.34	-2.99	-0.83	3.89	12.32
8	31.401	778071.65	145343.48	1798.50	24.82	6.91	-9.00	-6.33	12.99	29.15
9	56.742	778043.99	145320.58	1798.30	0.96	1.17	-1.70	-1.06	2.32	27.30
10	50.922	778076.89	145346.46	1798.51	67.99	8.39	-14.20	-15.41	22.57	43.06
12	50.822	778037.37	145315.76	1798.23	1.49	1.58	-1.82	-1.85	3.03	37.45
14	44.642	778027.15	145294.12	1798.18	15.58	0.82	-8.93	-3.44	9.61	20.99

"impact\_trajectories.txt":

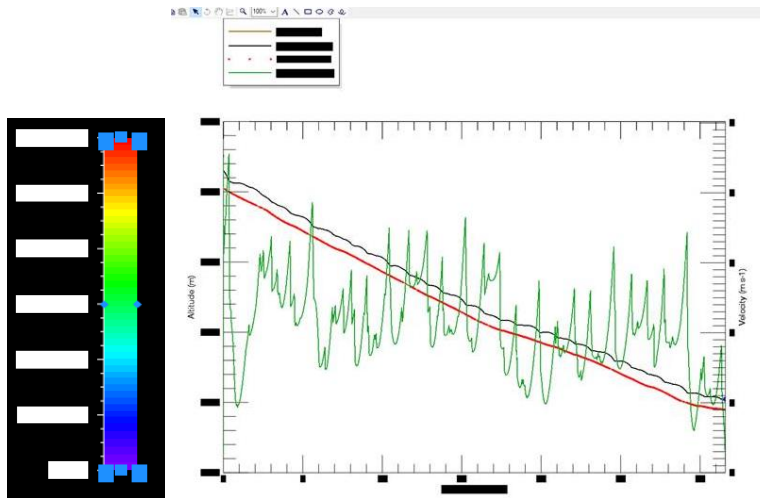
This file shows all trajectories passing your shapefile, even if they do not impact.

- **New Feature: Rock-Builder improved** → A new feature has been added to the Rock-Builder. It's now possible to change the individual axis of your rock. Choose your rock from the rock-library, then unlock the axis-aspect and set individual axis-lengths.



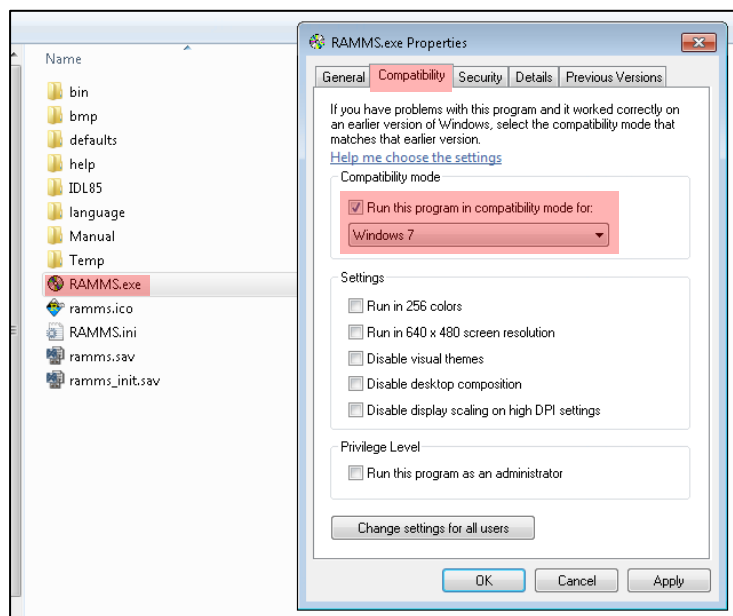
V 1.6.70 [2018-03-30]

- **Bugfix: Colorbar and Plot Problem** → we realized that this is an IDL problem with Windows 10. Many users complained about not seeing numbers and text from colorbars and plots.



You can fix this by running RAMMS in "Windows 7 Compatibility Mode". Please do the following:

- Exit RAMMS
- open Windows Explorer and navigate to your RAMMS installation folder.
- right-click on **RAMMS.exe**
- choose the tab **Compatibility**
- select the checkbox **"Run this program in compatibility mode for:"**
- choose **Windows 7** from the dropdown menu
- and then click Apply and OK.
- Restart RAMMS. All your plots and colorbars should be ok now.



- **Improvement: Shapefile Holes** → small improvement.

V 1.6.61 [2017-09-29]

- **Bugfix: Polyline Shapefile** → A small issue from the last update. Resolved.

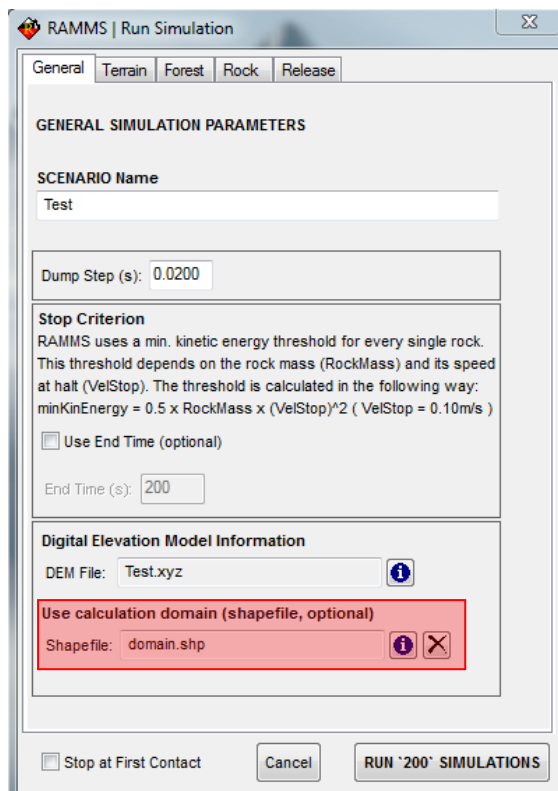


#### V 1.6.60 [2017-09-28]

- **Bugfix: Polyline Shapefile** → Due to a small bug, some polyline shapefiles (created in a GIS software) could not be used as release polyline shapefiles. Resolved.

#### V 1.6.58 [2017-08-12]

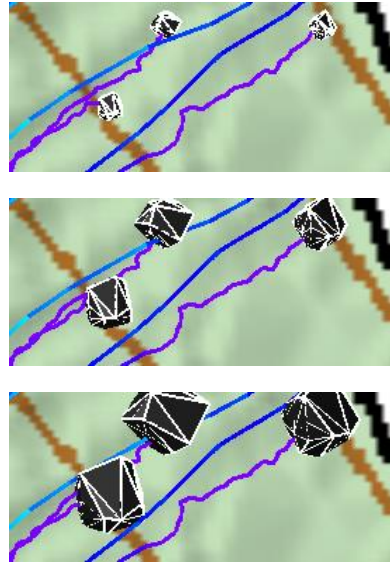
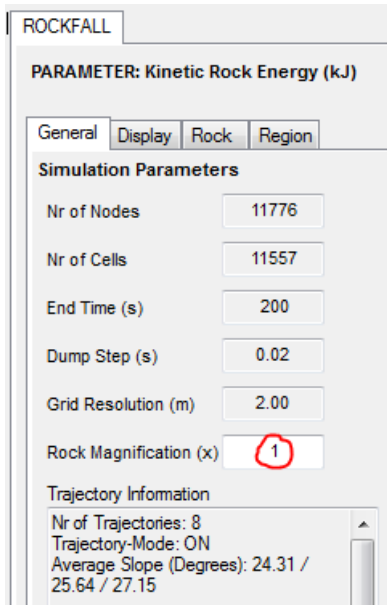
- **Bugfix: Rock Magnification** → when specifying 0 (zero) as rock magnification, RAMMS crashed. Resolved.
- **Bugfix: Shapefile Holes** → Holes in release shapefiles were not accounted for until now. Resolved.
- **Bugfix:** RAMMS crashed when trying to open complicated polygon shapefiles. Resolved.
- **Improvement:** When using large DEM's with large polygon shapefile, the preparation of a scenario could take a very long time. Procedure improved. Preparation time in seconds.
- **New Feature:** All the scenario start positions are written into a point shapefile named `<scenario_name>_StartPositions.shp`.
- **New Feature:** Calculation Domain → to improve the calculation speed, we implemented the possibility to specify a polygon shapefile as a "calculation domain", similar to the avalanche and debrisflow modules of RAMMS.



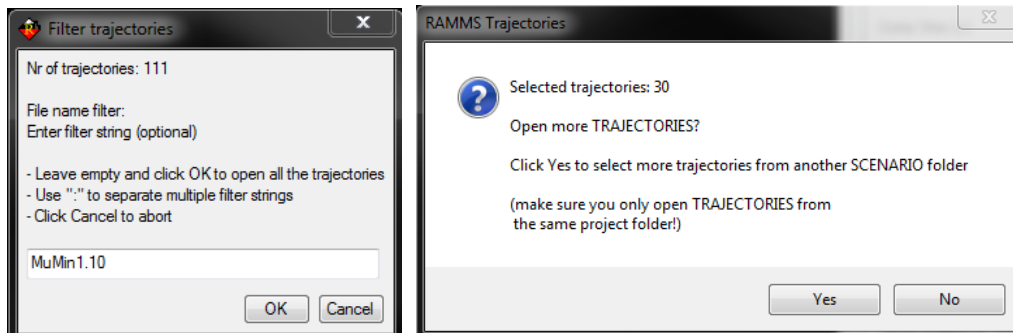
#### V 1.6.55 [2016-06-29]

- **Improvement:** Performance gain reading large scenarios in statistic mode → after a successful scenario calculation, RAMMS saves the information of all scenario-trajectories on disc in the scenario folder. When reopening the scenario in statistic mode, RAMMS can restore this information, resulting in a much faster opening of the scenario.

- **New Feature:** Rock magnification → in trajectory mode, the size of the rocks can be changed dynamically.

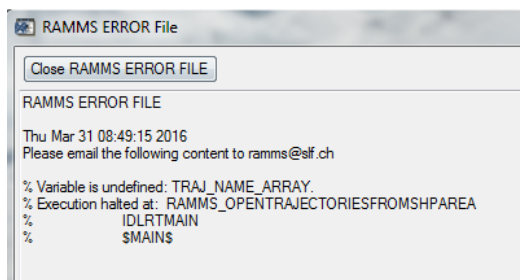


- **New Feature:** Open trajectories → it's possible to filter the trajectories (same as with scenarios) as well as open trajectories from different scenario folders (within the same project).



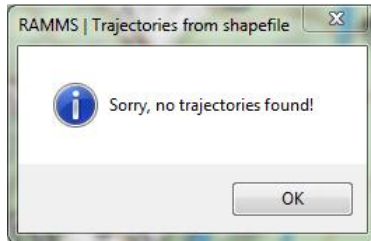
#### v 1.6.52 [2016-03-31]

- **Bugfix:** Extras → Open Trajectories from Shapefile: Selecting a shapefile where no trajectories pass resulted in this error message:



Resolved.


RAMMS displays this window in case of no trajectories:

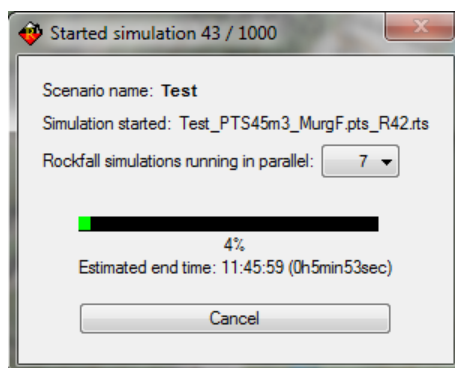


#### V 1.6.51 [2016-03-16]

- **Bugfix:** Update 1.6.50 introduced a small bug when selecting trajectories in *Trajectory Mode*. Name and details of trajectory were not updated. Resolved.
- **Bugfix:** After selecting a trajectory in *Trajectory Mode*, it could happen that the values of the main time slider changed from seconds to centiseconds (but not the unit). Resolved.
- **Bugfix:** Holes in shapefiles: If the holes of a shapefile lie outside of the project region, RAMMS cannot process the shapefile. Resolved.

#### V 1.6.50 [2016-03-09]

- **Bugfix:** The automatically saved shapefile `<Scenario-Name>_Trajectories.shp` (containing all the trajectories as polyline shapefiles) sometimes did not contain all contact points (resulting in wrong trajectory paths): Resolved.
- **Bugfix:** Error "ramms\_rock.exe stopped working" resolved.
- **Bugfix:** Error "Variable is undefined: WBAD." resolved.
- **Bugfix:** Error "WIDGET\_CONTROL: Illegal keyword value for SCR\_XSIZE" resolved.
- **Improvement:** New button 'Open Rockfall Trajectories'  in horizontal toolbar.
- **Improvement:** new style of run calculation window. Nr of running simulations in parallel can be changed dynamically! Started simulation name and scenario name are indicated. Estimated end time as well as duration are indicated.



- **New Feature:** *Extras* → *Open Trajectories from Shapefile*: Select a shapefile in *Statistic Mode*, and all the trajectories passing or stopping in the shapefile are opened.
- **Improvement:** *Trajectory Data Log File* did not show units of parameters: resolved.
- **Improvement:** Holes within shapefiles were not handled correctly: resolved.
- **New Feature:** *Barrier Plot* shows nr of passing trajectories (Traj.) as well as nr of stopped rocks (Stopped) within barrier polygon or line profile shapefiles.

### Barrier - Statistics Summary:

**Parameter: Jump Height (m)**

Min / Max: 1.62 / 10.46

Mean / Median: 3.48 / 3.11

Std Dev: 1.23

Q1 / Q3 / IQR: 2.58 / 4.16 / 1.58

Q90 / Q95 / Q99: 5.42 / 5.91 / 6.87

Scenario: Engi

Polygon: Test.shp

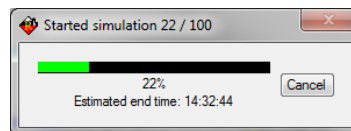
Traj./Stopped: 26/13

Nr of Data Values: 786

Histogram Bin Size: 0.33

#### V 1.6.43 [2015-06-19]

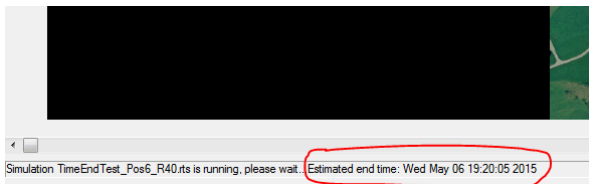
- **Improvement:** Performance of gathering model input data and preparation of input scenario improved. Finding release points within a release area benefits also from this improvement, see V 1.6.41.
- **Improvement:** Scenario-Calculation could not be cancelled easily. A new progress window was implemented, showing also the estimated end time of the calculation.



- **Bugfix:** Filename-Attribute of the automatically generated 'Trajectories.shp' shapefile sometimes did not show the full filename. Resolved.

#### V 1.6.41 [2015-05-27]

- **Improvement:** Procedure to find release points within polygon release areas improved. For huge release areas this procedure can still be time consuming. In a later release, this procedure will be further improved.
- **Improvement:** Manual included and available from the download section of [ramms.slf.ch](http://ramms.slf.ch)
- **New Feature:** During a simulation, an estimated end time is displayed in the lower left status bar, see picture below.



#### V 1.6.40 [2015-04-17]

- Official release of RAMMS::ROCKFALL Module
- Manual not yet available
- Web page at <http://ramms.slf.ch>
- Email: [ramms@slf.ch](mailto:ramms@slf.ch)