



Fallbeispiel BASEplane

Davood FARSHI





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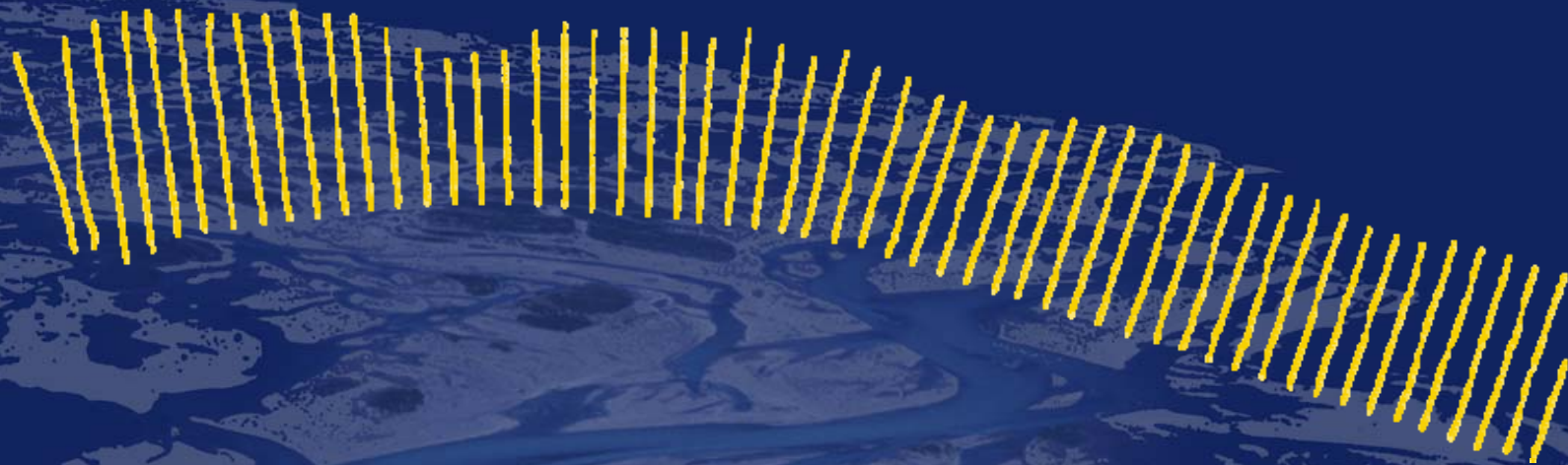
Gittererstellung

Rohdaten:

- **Querprofile**
- **Rasterdaten**
- **Punktdaten**



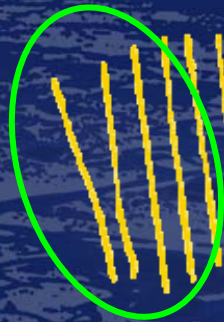
Gittererstellung



Querprofilaufnahme von 2004

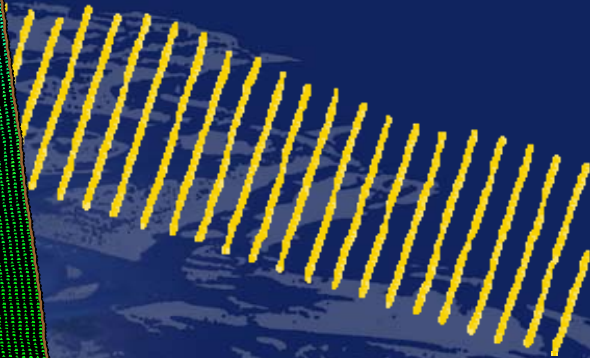
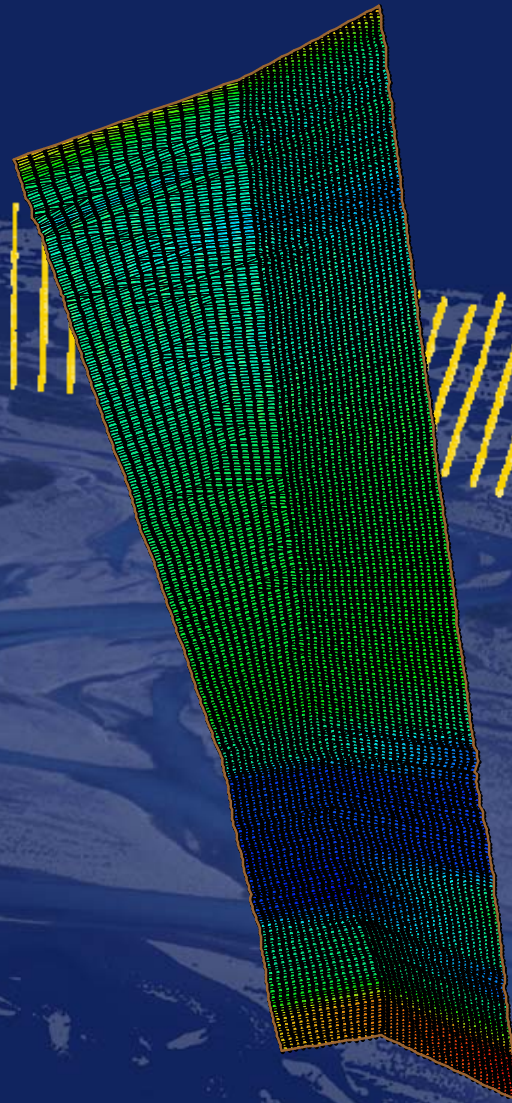


Gittererstellung



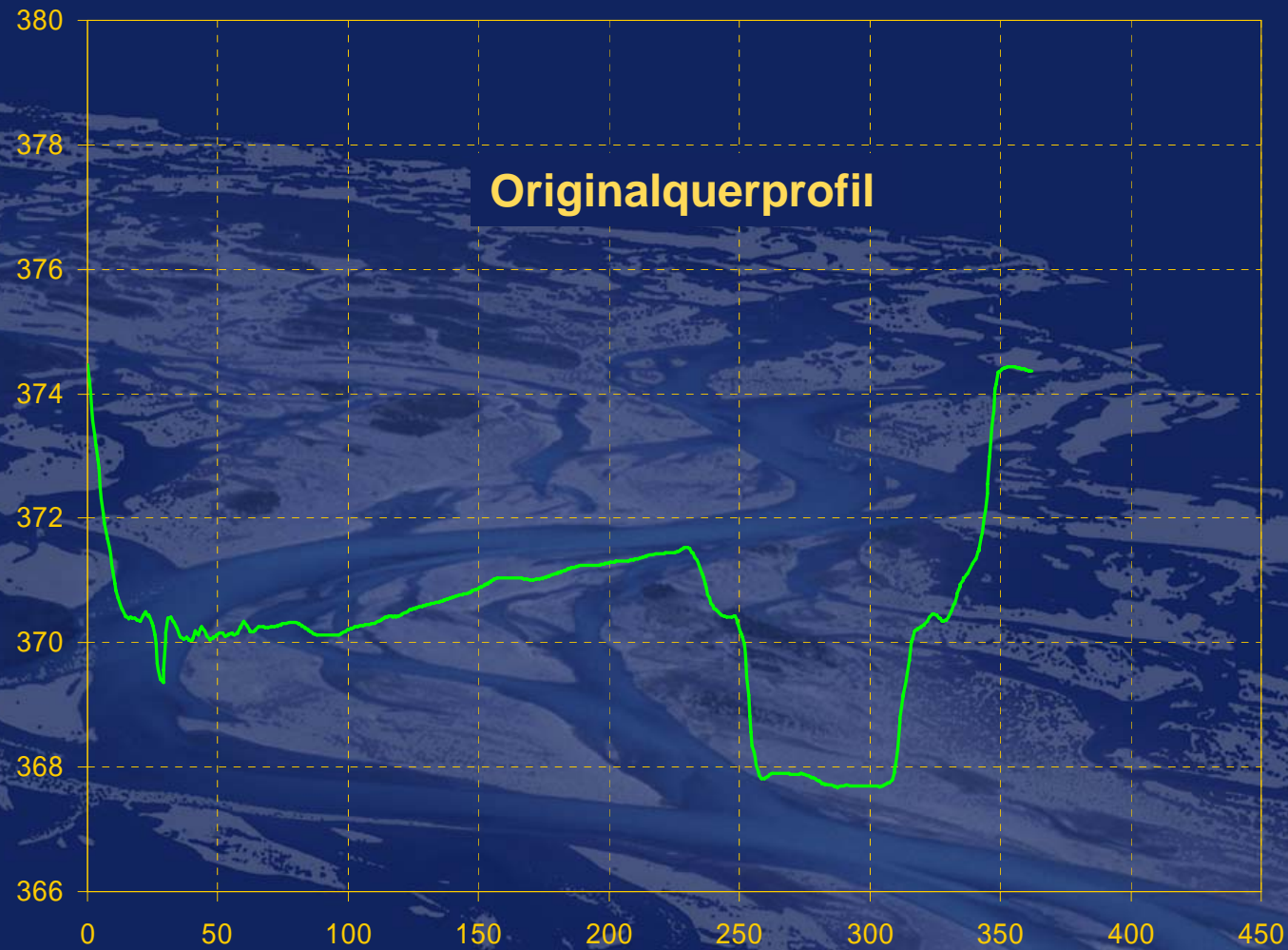
12249 Knoten

12337 Elemente





Gittererstellung





Gittererstellung





Gittererstellung

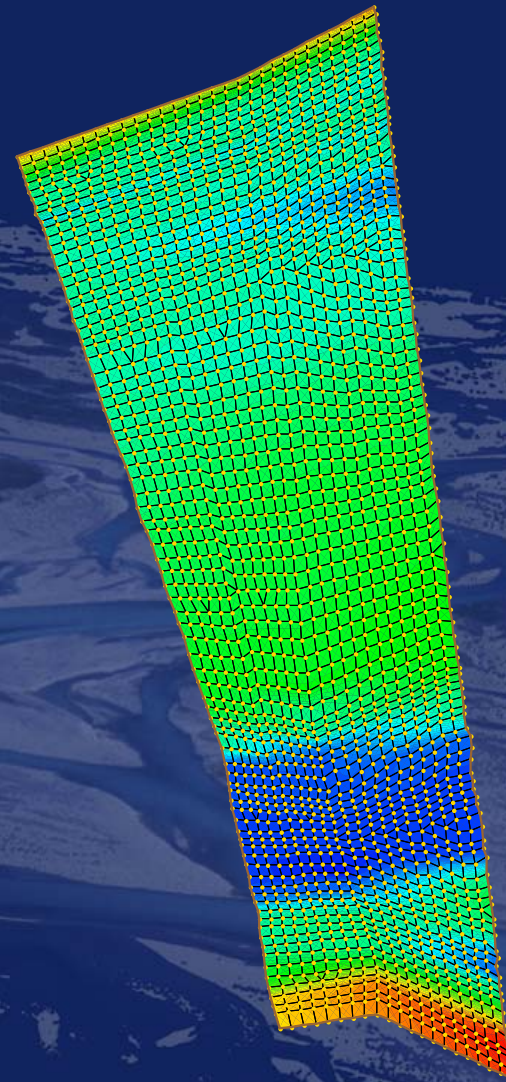
12249 Knoten

12337 Elemente



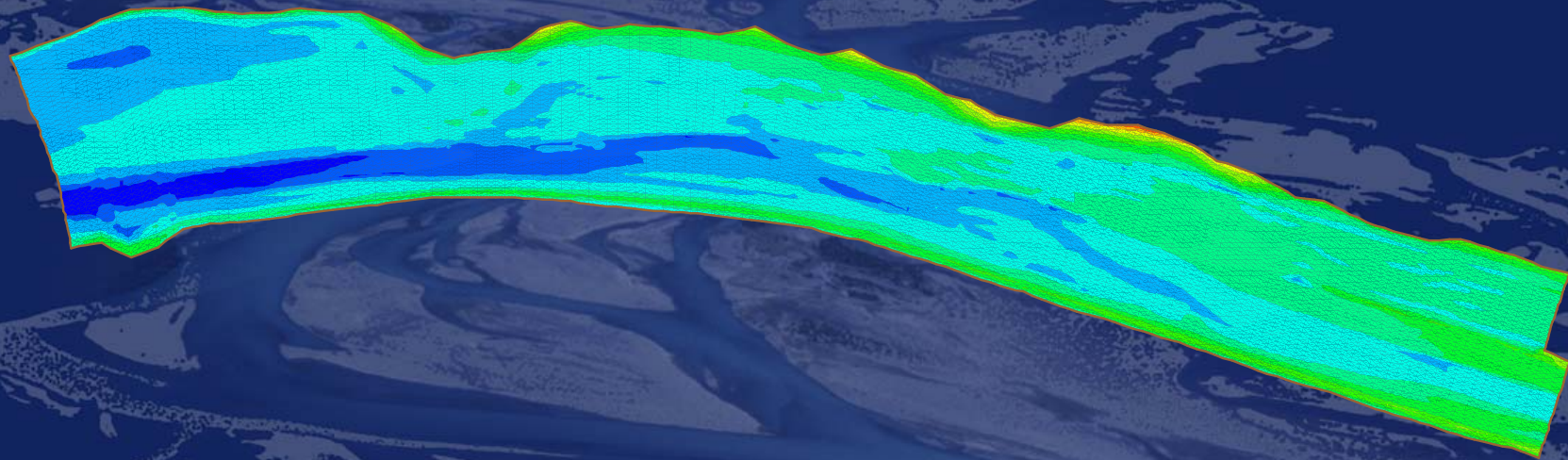
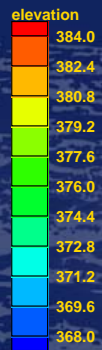
2181 Knoten

2079 Elemente



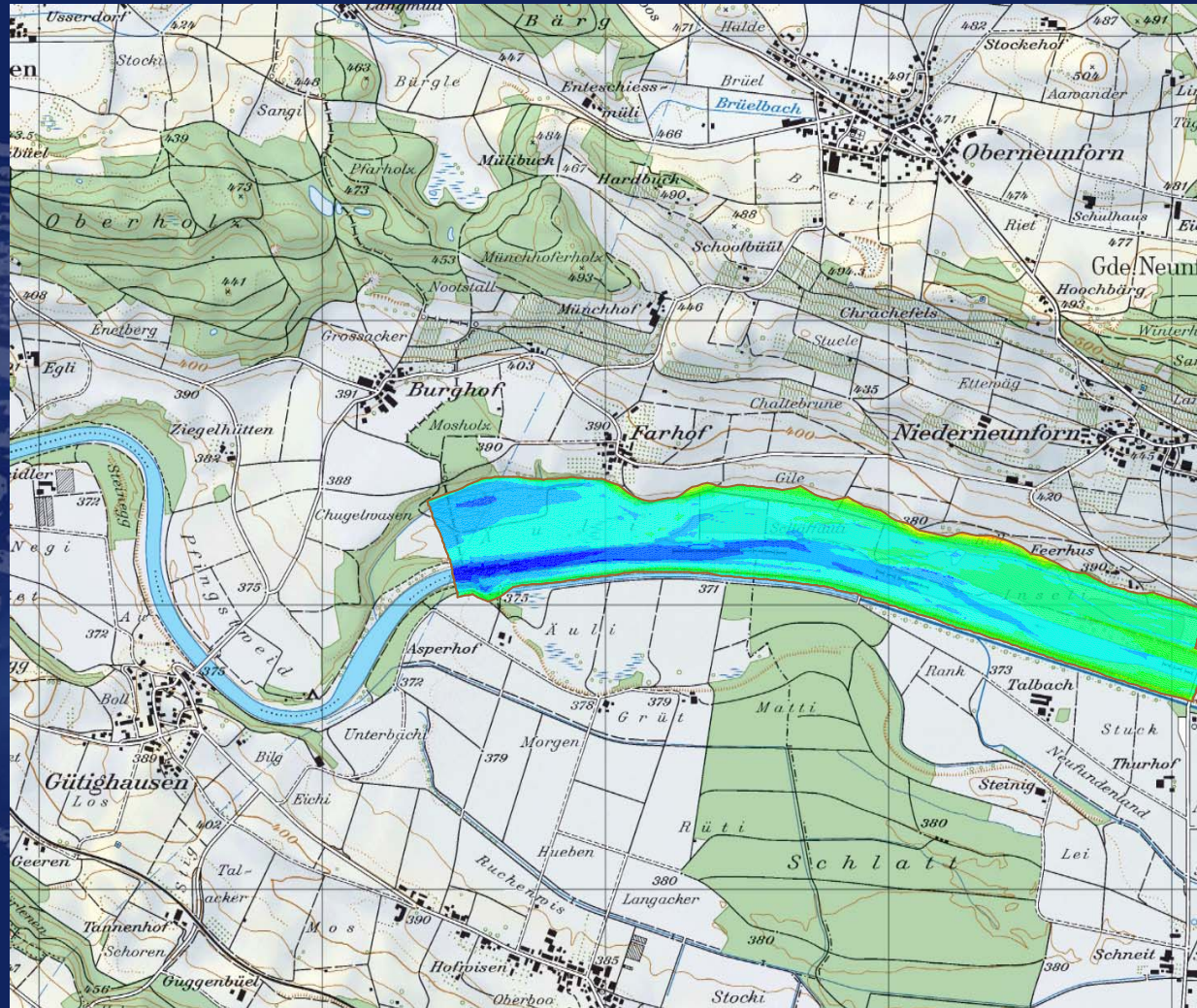


Gittererstellung



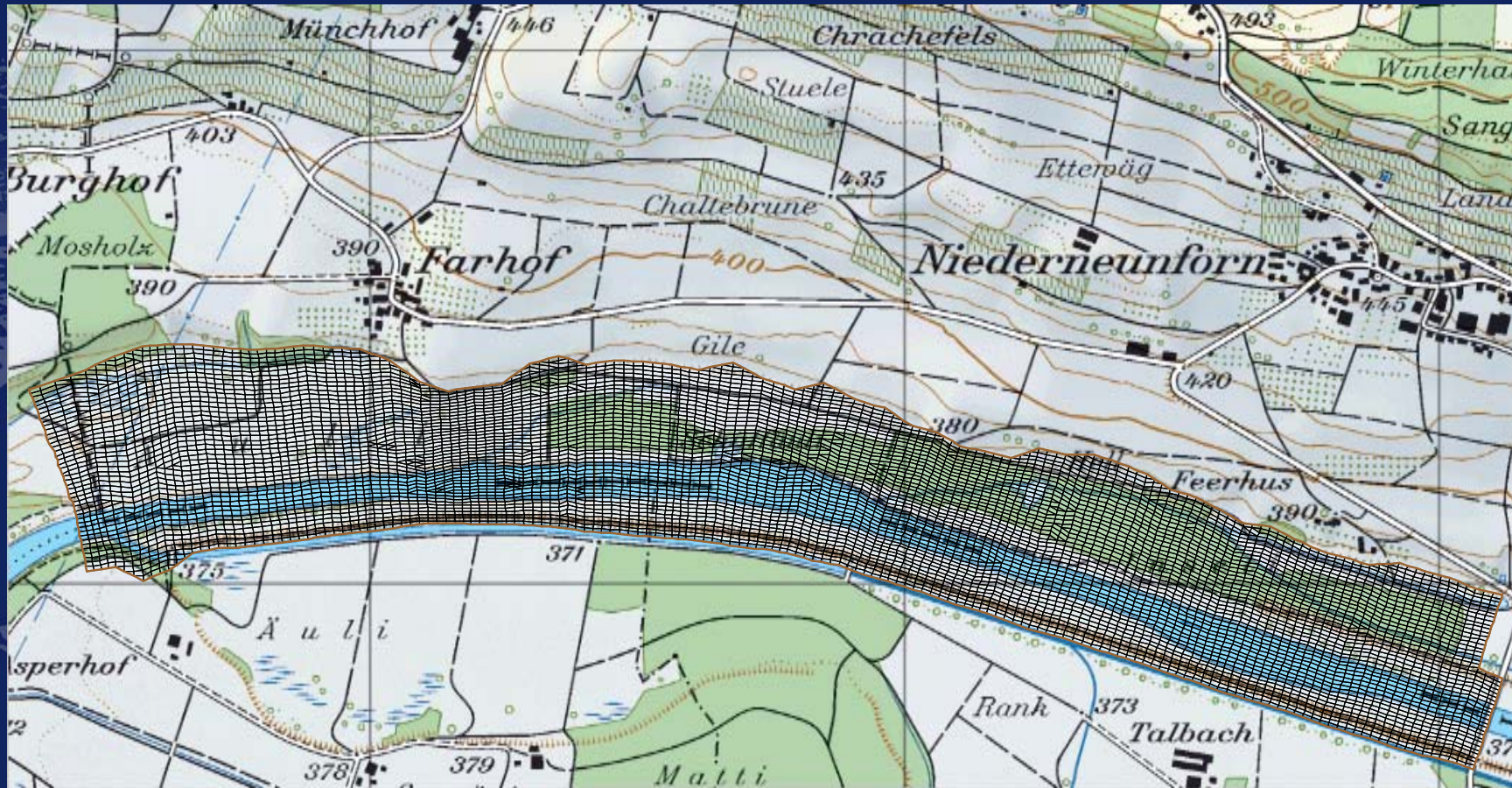


Gittererstellung





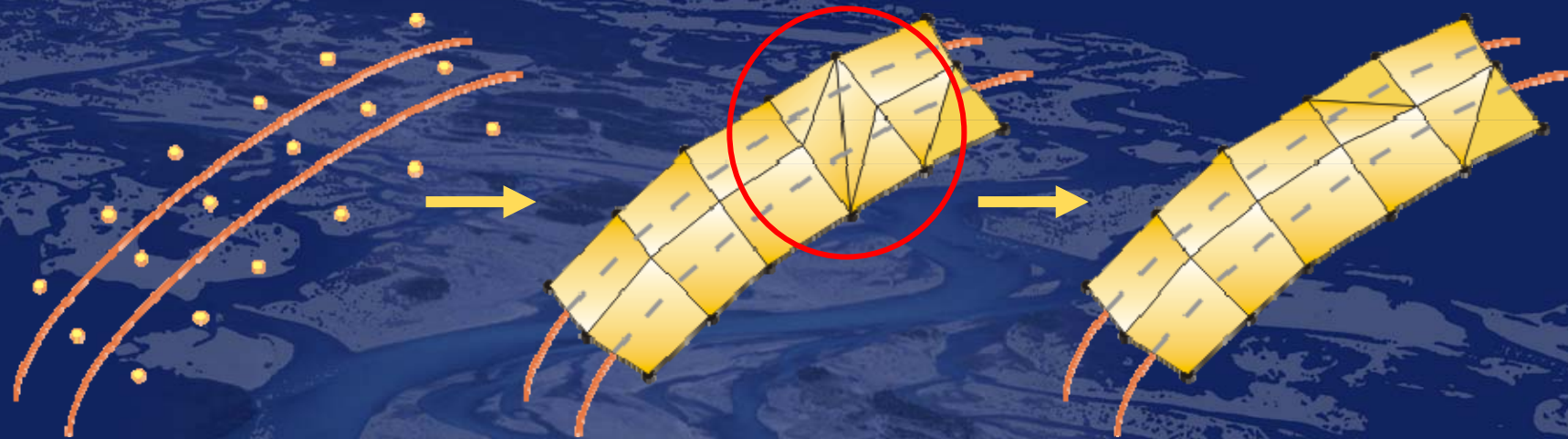
Gittererstellung





Gittererstellung

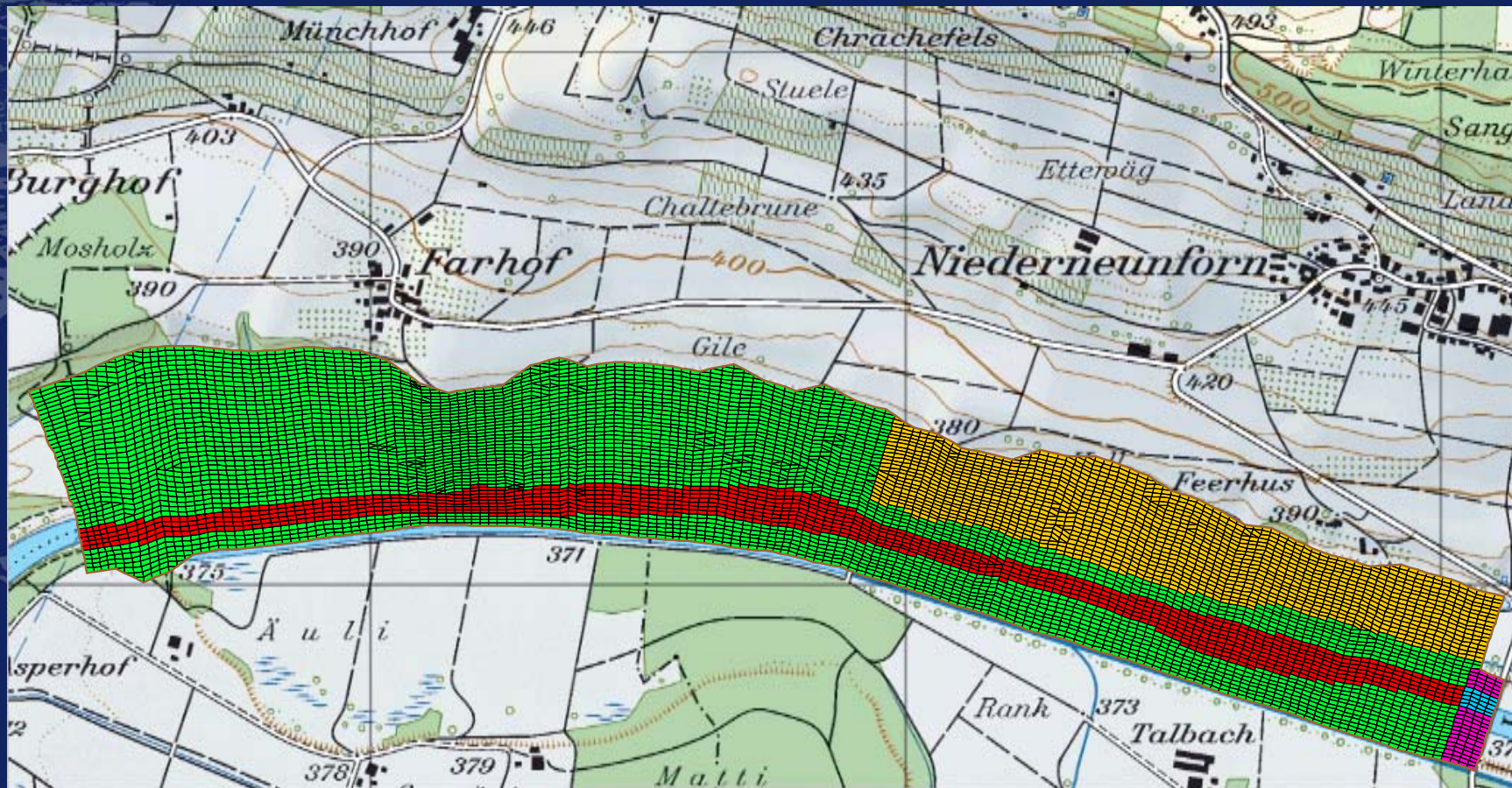
Bruchkanten





Gittererstellung

- Hauptgrinne
- Vorländer
- Busch
- Feste Sohle
- Feste Sohle





Command-File

```
BASEPLANE_2D
{
  region name = Thur
  GEOMETRY
  {
    ...
  }
  HYDRAULICS
  {
    ...
  }
  MORPHOLOGY
  {
    ...
  }
  OUTPUT
  {
    ...
  }
}
```

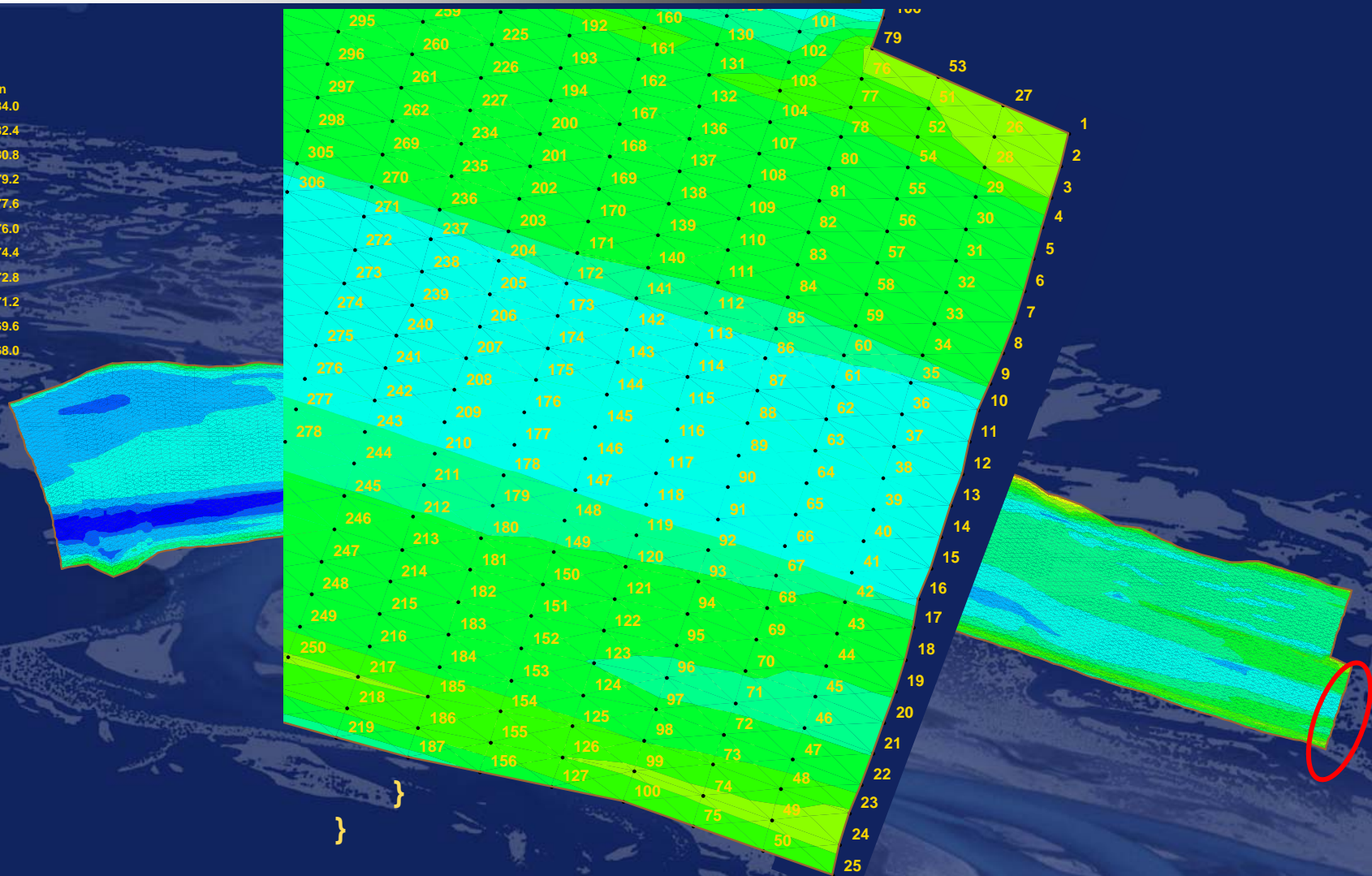
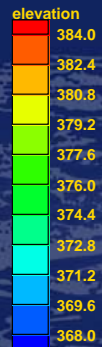


Command-File

```
GEOMETRY
{
  geometry_type = sms
  geofile = thur_final.2dm
  STRINGDEF
  {
    string_name = Inlet
    node_ids =
  }
}
```



Command-File





Command-File

```
GEOMETRY
{
  geometry_type = sms
  geofile = thur_final.2dm
  STRINGDEF
  {
    string_name = Inlet
    node_ids =
    ( 1 2 3 4 5 6 7 8 9 10 11
    12 13 14 15 16 17 18 19 20 21 22
    23 24 25 )
    string_name = Outlet
    node_ids =
  }
}
```

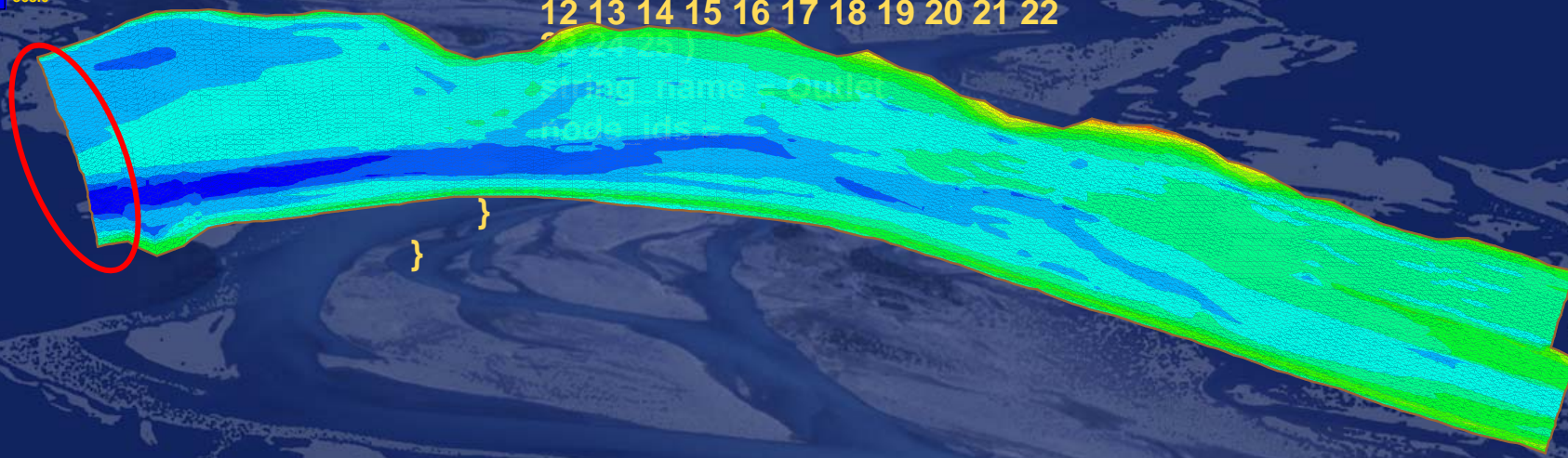
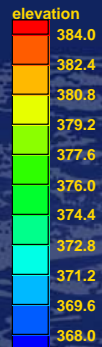


Command-File

GEOMETRY

```

{
  geometry_type = sms
  geofile = thur_final.2dm
  STRINGDEF
  {
    string_name = Inlet
    node_ids =
    ( 1 2 3 4 5 6 7 8 9 10 11
    12 13 14 15 16 17 18 19 20 21 22
  )
  }
  {
    string_name = outlet
    node_ids =
    ( 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 )
  }
}
    
```





Command-File

```
GEOMETRY
{
  geometry_type = sms
  geofile = thur_final.2dm
  STRINGDEF
  {
    string_name = Inlet
    node_ids =
    ( 1 2 3 4 5 6 7 8 9 10 11
      12 13 14 15 16 17 18 19 20 21 22
      23 24 25 )
    string_name = Outlet
    node_ids =
    ( 7117 7116 7118 7119
      7120 7121 7122 7123 7124 7125
      7126 7127 7128 7129 7130 7131
      7132 7133 7134 7135 7136 7137
      7138 7139 7140 7141 7142 7143
      7144 7145 7146 7147 7148 7149
      7150 7151 7152 7153 7154 7155
      7156 7157 7158 7159 )
  }
}
```



Command-File

```
HYDRAULICS
{
  BOUNDARY
  {
    ...
  }
  INITIAL
  {
    ...
  }
  SOURCE
  {
    ...
  }
  PARAMETER
  {
    ...
  }
}
```



Command-File

```
HYDRAULICS  
{  
  BOUNDARY  
  {  
    ...  
  }  
  INITIAL  
  {  
    ...  
  }  
  SOURCE  
  {  
    ...  
  }  
  PARAMETER  
  {  
    ...  
  }  
}
```

BOUNDARY

```
{  
  boundary_type = hydrograph  
  boundary_string_name = Inlet  
  boundary_file = hq100.txt  
}
```

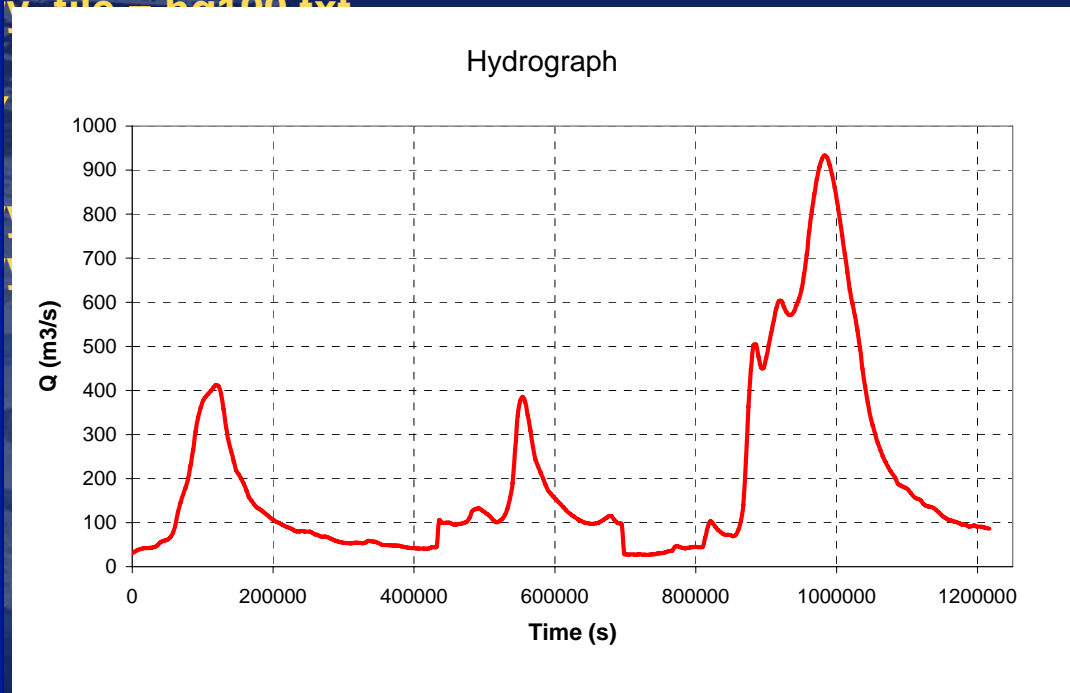


Command-File

```

hq100 - Notepad
File Edit Format View Help
/// Hochwasser 2005
/// Zeit (s) Abfluss (m3/s)
/// -----
0          30.648
3600       34.05
7200       37.305
10800      39.707
14400      41.18
18000      41.916
21600      42.275
25200      42.654
.
.
.
964800     806.762
968400     846.318
972000     879.721
975600     907.279
979200     925.589
982800     933.018
986400     928.696
990000     912.605
993600     889.543
997200     860.478
.
.
.
1209600    89.032
1213200    87.604
1216800    86.104
    
```

y_type = hydrograph
y_string_name = Inlet
y_file = hq100.txt





Command-File

```
HYDRAULICS
{
  BOUNDARY
  {
    ...
  }
  INITIAL
  {
    ...
  }
  SOURCE
  {
    ...
  }
  PARAMETER
  {
    ...
  }
}
```

BOUNDARY

```
{
  boundary_type = hydrograph
  boundary_string_name = Inlet
  boundary_file = hq100.txt
}
```

BOUNDARY

```
{
  boundary_type = zero_gradient
  boundary_string_name = outlet
}
```



Command-File

```
HYDRAULICS
{
    BOUNDARY
    {
        ...
    }
    INITIAL
    {
        ...
    }
    SOURCE
    {
        ...
    }
    PARAMETER
    {
        ...
    }
}
```

INITIAL

```
{
    initial_type = dry
}
```




Command-File

```
HYDRAULICS
{
    BOUNDARY
    {
        ...
    }
    INITIAL
    {
        ...
    }
    SOURCE
    {
        ...
    }
    PARAMETER
    {
        ...
    }
}
```

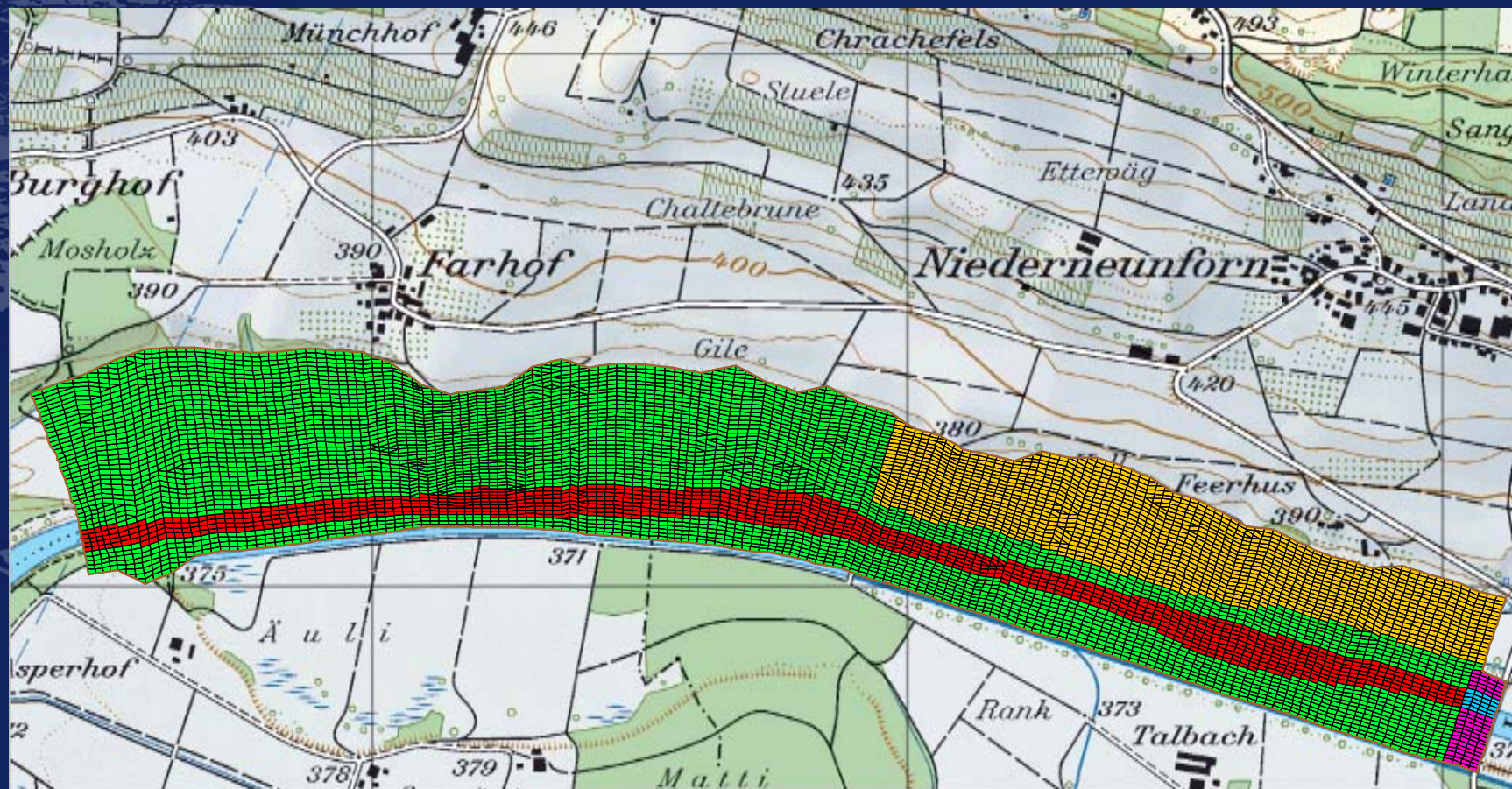
SOURCE

```
{
    friction_type = manning
    input_type    = index_table
}
```



Command-File

- Hauptgrinne
- Vorländer
- Busch
- Feste Sohle
- Feste Sohle





Command-File

```
HYDRAULICS
{
    BOUNDARY
    {
        ...
    }
    INITIAL
    {
        ...
    }
    SOURCE
    {
        ...
    }
    PARAMETER
    {
        ...
    }
}
```

SOURCE

```
{
    friction_type = manning
    input_type    = index_table
    // Material Index
    index         = ( 1 2 3 4 5 )
    n_manning     = ( 0.028 0.032 0.055 0.032 0.028 )
    // cte eddy viscosity
    inner_viscosity = ( 0.0 0.0 0.0 0.0 0.0 )
}
```



Command-File

```
HYDRAULICS
{
  BOUNDARY
  {
    ...
  }
  INITIAL
  {
    ...
  }
  SOURCE
  {
    ...
  }
  PARAMETER
  {
    ...
  }
}
```

PARAMETER

```
{
  simulation_scheme = exp // Explizit
  riemann_solver = HLL // or EXACT
  CFL = 0.85
  Total_run_time = 1216805.1
  minimum_water_depth = 0.05
  initial_time_step = 0.001
  minimum_time_step = 1.0e-3
}
```



Command-File

```
MORPHOLOGY
{
  BEDMATERIAL
  {
    ...
  }
  BOUNDARY
  {
    ...
  }
  INITIAL
  {
    ...
  }
  SOURCE
  {
    ...
  }
  PARAMETER
  {
    ...
  }
}
```



Command-File

```
MORPHOLOGY
```

```
{
```

```
  BEDMATERIAL
```

```
  {
```

```
    ...
```

```
  }
```

```
  BOUNDARY
```

```
  {
```

```
    ...
```

```
  }
```

```
  INITIAL
```

```
  {
```

```
    ...
```

```
  }
```

```
  SOURCE
```

```
  {
```

```
    ...
```

```
  }
```

```
  PARAMETER
```

```
  {
```

```
    ...
```

```
  }
```

```
}
```

```
BEDMATERIAL
```

```
{
```

```
  GRAIN_CLASS
```

```
  {
```

```
  }
```

```
  MIXTURE
```

```
  {
```

```
  }
```

```
  SOIL_DEF
```

```
  {
```

```
  }
```

```
  FIXED_BED
```

```
  {
```

```
  }
```

```
  SOIL_ASSIGNMENT
```

```
  {
```

```
  }
```

```
}
```



Command-File

```
MORPHOLOGY
{
  ...
  BEDMATERIAL
  {
    ...
  }
  BOUNDARY
  {
    ...
  }
  INITIAL
  {
    ...
  }
  SOURCE
  {
    ...
  }
  PARAMETER
  {
    ...
  }
}

BEDMATERIAL
{
  GRAIN_CLASS
  {
    diameters = ( 25.0 )
  }
  MIXTURE
  {
    mixture_name = mixture1
    volume_fraction = ( 100.0 )
  }
  SOIL_DEF
  {
    soil_name = soil1
    d90_armored_layer = 0.0           // mm
    // Active Layer
    active_layer_height = 0.15       // m
    active_layer_mixture = mixture1
  }
  SUBLAYER
  {
    bottom_elevation = 365.0
    sublayer_mixture = mixture1
  }
}
...

```



Command-File

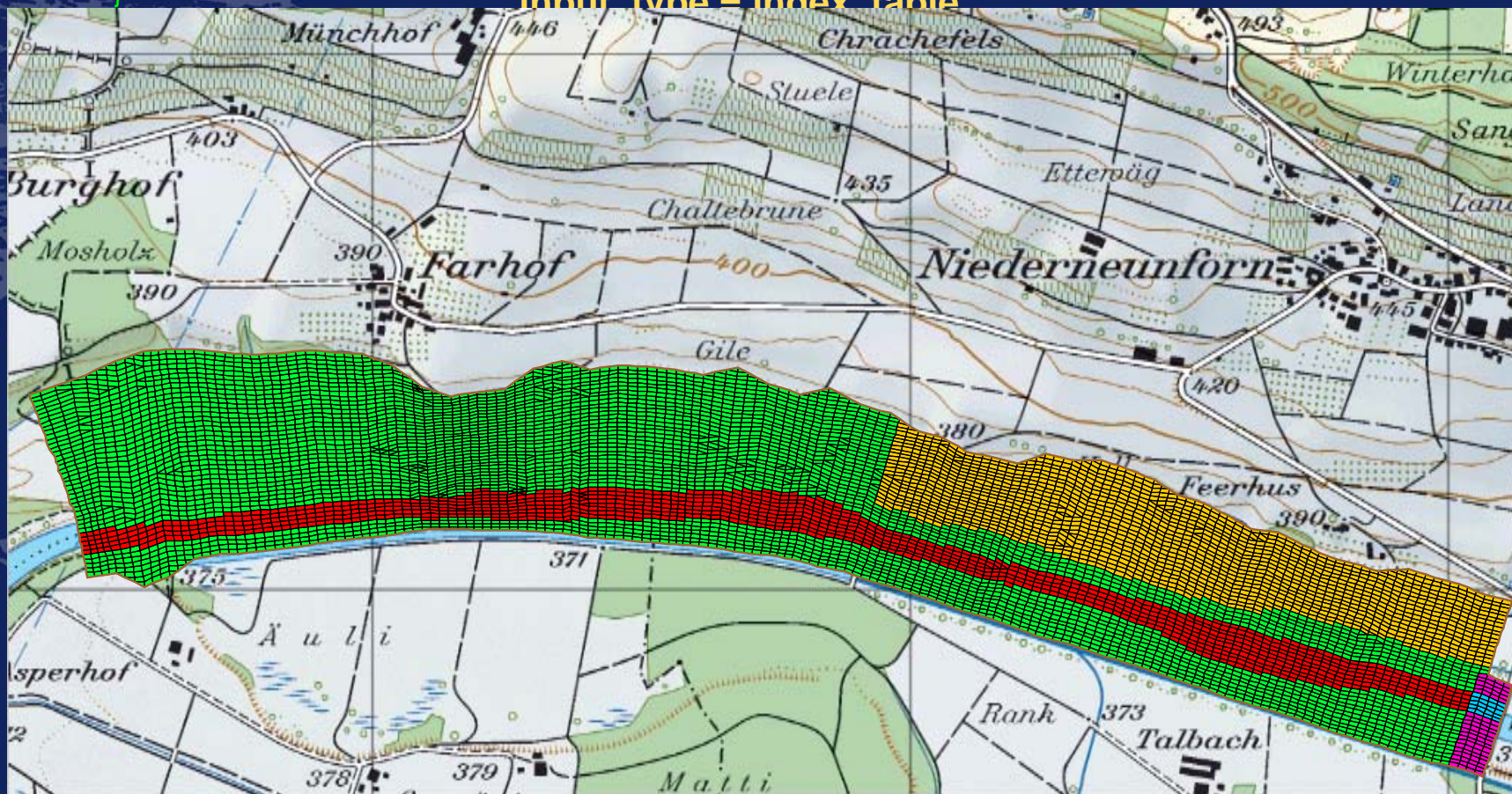
- MORPHOLOGY
- { Hauptgrinne
 - { Vorländer
 - { Busch
 - { Feste Sohle
 - { Feste Sohle

BEDMATERIAL

...
FIXED_BED

{

input_type - index table





Command-File

```
MORPHOLOGY
{
  BEDMATERIAL
  {
    ...
  }
  BOUNDARY
  {
    ...
  }
  INITIAL
  {
    ...
  }
  SOURCE
  {
    ...
  }
  PARAMETER
  {
    ...
  }
}

...
FIXED_BED
{
  input_type = index_table
  index      = ( 1 2 3 4 5 )
  zb_fix     = ( 250 250 250 -101 -101 )
}
SOIL_ASSIGNMENT
{
  input_type = index_table
  index      = ( 1 2 3 4 5 )
  soil       = ( soil1 soil1 soil1 soil1 soil1 )
}
}
```



Command-File

```
MORPHOLOGY
```

```
{
```

```
  BEDMATERIAL
```

```
  {
```

```
    ...
```

```
  }
```

```
  BOUNDARY
```

```
  {
```

```
    ...
```

```
  }
```

```
  INITIAL
```

```
  {
```

```
    ...
```

```
  }
```

```
  SOURCE
```

```
  {
```

```
    ...
```

```
  }
```

```
  PARAMETER
```

```
  {
```

```
    ...
```

```
  }
```

```
}
```

```
BOUNDARY
```

```
{
```

```
  // Keine Randbedingung
```

```
}
```

```
INITIAL
```

```
{
```

```
  // Schwache Anfangsbedingung
```

```
  // Die Anfangshöhe ist die Anfangsbedingung
```

```
}
```



Command-File

```
MORPHOLOGY
```

```
{
```

```
  BEDMATERIAL
```

```
  {
```

```
    ...
```

```
  }
```

```
  BOUNDARY
```

```
  {
```

```
    ...
```

```
  }
```

```
  INITIAL
```

```
  {
```

```
    ...
```

```
  }
```

```
  SOURCE
```

```
  {
```

```
    ...
```

```
  PARAMETER
```

```
  {
```

```
    ...
```

```
  }
```

```
}
```

```
  SOURCE
```

```
  {
```

```
    EXTERNAL_SOURCE
```

```
    {
```

```
      source_type = sediment_discharge
```

```
      element_ids = ?
```

```
      source_file = ?
```

```
      source_mixture = mixture1
```

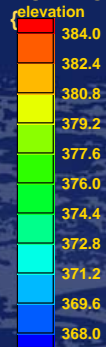
```
    }
```

```
  }
```



Command-File

MORPHOLOGY



BEDMATERIAL

```
{  
  ...  
}  
BOUNDARY  
{  
  ...  
}  
INITIAL  
{  
  ...  
}
```

SOURCE

```
{
```

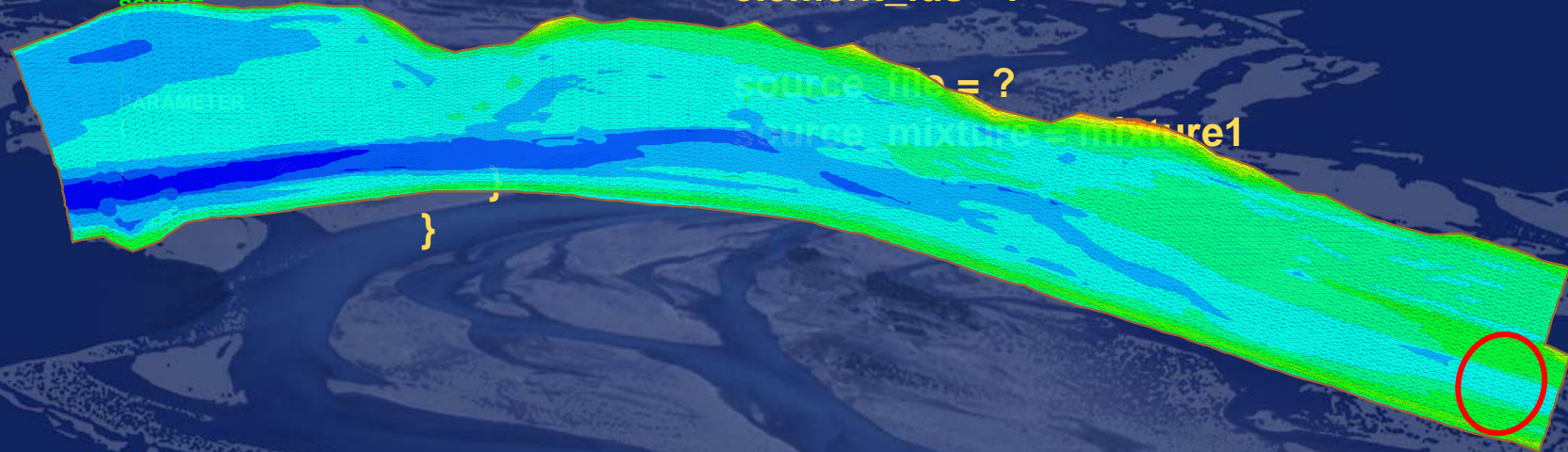
EXTERNAL_SOURCE

```
{
```

```
source_type = sediment_discharge  
element_ids = ?
```

```
source_ids = ?
```

```
source_mixture = mixture1
```

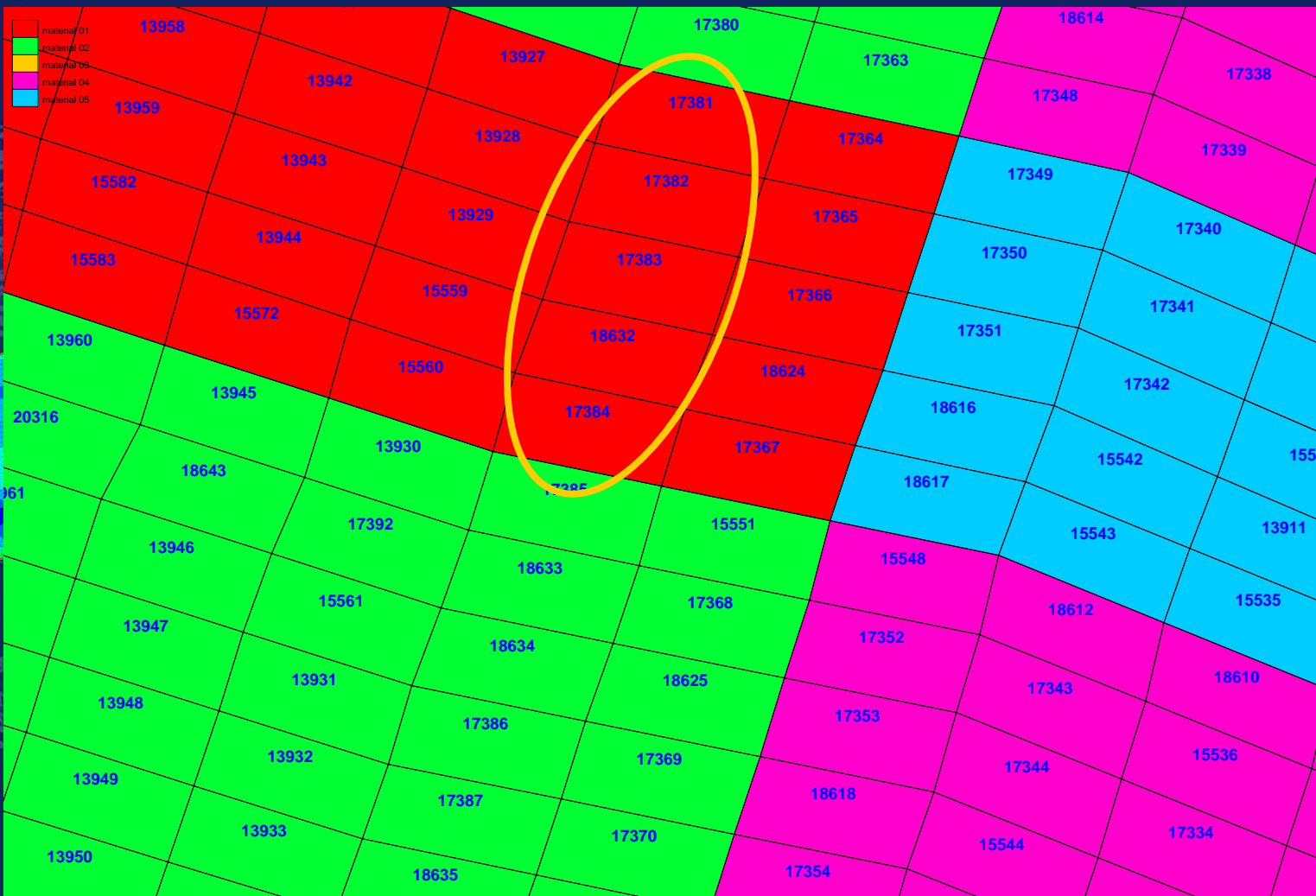
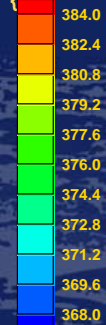




Command-File

MORPHOLOGY

elevation





Command-File

```
MORPHOLOGY
```

```
{
```

```
  BEDMATERIAL
```

```
  {
```

```
    ...
```

```
  }
```

```
  BOUNDARY
```

```
  {
```

```
    ...
```

```
  }
```

```
  INITIAL
```

```
  {
```

```
    ...
```

```
  }
```

```
  SOURCE
```

```
  {
```

```
    ...
```

```
  } PARAMETER
```

```
  {
```

```
    ...
```

```
  }
```

```
}
```

```
  SOURCE
```

```
  {
```

```
    EXTERNAL_SOURCE
```

```
    {
```

```
      source_type = sediment_discharge
```

```
      element_ids =
```

```
      ( 17380 17381 17382 17383  
        18632 17384 )
```

```
      source_file = ?
```

```
      source_mixture = mixture1
```

```
    }
```

```
  }
```





Command-File

MOR

{

```

Bedload_in_time.txt - Notepad
File Edit Format View Help
// Geschiebezugabe
// Zeit(s)          qb(m3/sec)
// -----
0                0
3600             0
.               .
.               .
.               .
93600            0
97200            0.001842393
100800           0.005878685
104400           0.008298898
108000           0.009781692
111600           0.011411828
115200           0.013454053
118800           0.014982404
122400           0.014271204
126000           0.009774923
129600           0.000750863
133200           0
.               .
.               .
.               .
547200           0
550800           0.005528291
554400           0.007934187
558000           0.004835054
561600           0
.               .
.               .
.               .
871200           0
874800           0.002241206
878400           0.02401089
882000           0.038617554
885600           0.038768281
889200           0.031592246
892800           0.025301566
896400           0.025010786
900000           0.030955498
903600           0.038803164
907200           0.045744649

```

}

NAL_SOURCE

source_type = sediment_discharge

element_ids =

(17380 17381 17382 17383
18632 17384)

source_file = bedload_in_time.txt

source_mixture = mixture1



Command-File

```
MORPHOLOGY
{
  BEDMATERIAL
  {
    ...
  }
  BOUNDARY
  {
    ...
  }
  INITIAL
  {
    ...
  }
  SOURCE
  {
    ...
  }
  PARAMETER
  {
    ...
  }
}

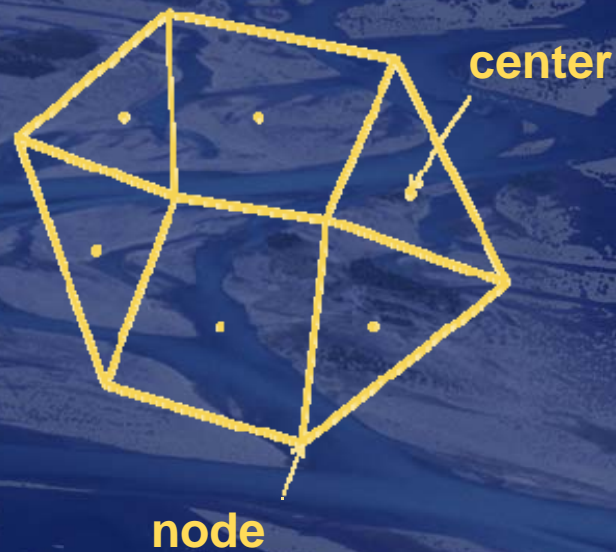
PARAMETER
{
  bedload_transport = MPM // MPMH - PAR
  bedload_routing_start = 0.0
  bedload_factor = 1
  diffusion_coefficient = 0.005
  upwind_factor = 0.5
  hydro_steps = 0

  porosity = 37 // %
  angle_of_repose = 30 //degree
  density = 2650 // kg / m3
}
```



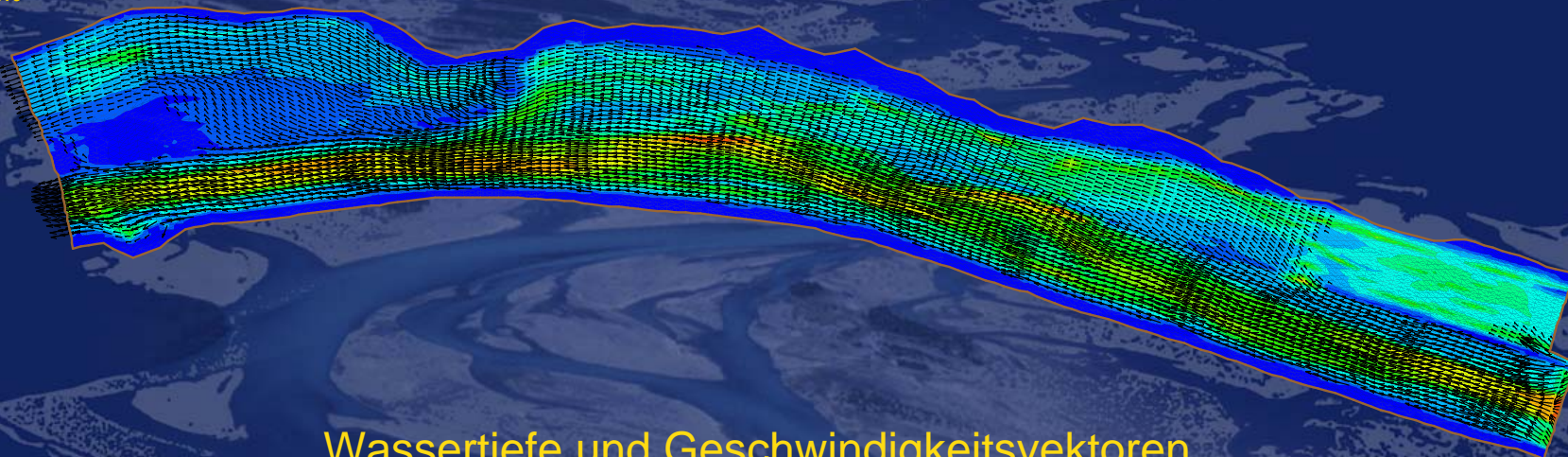
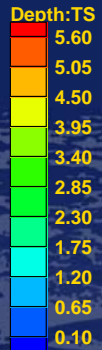

Command-File

```
OUTPUT
{
  output_time_step = 3600.0
  console_time_step = 600.0
  results_location = node      // or center
}
```





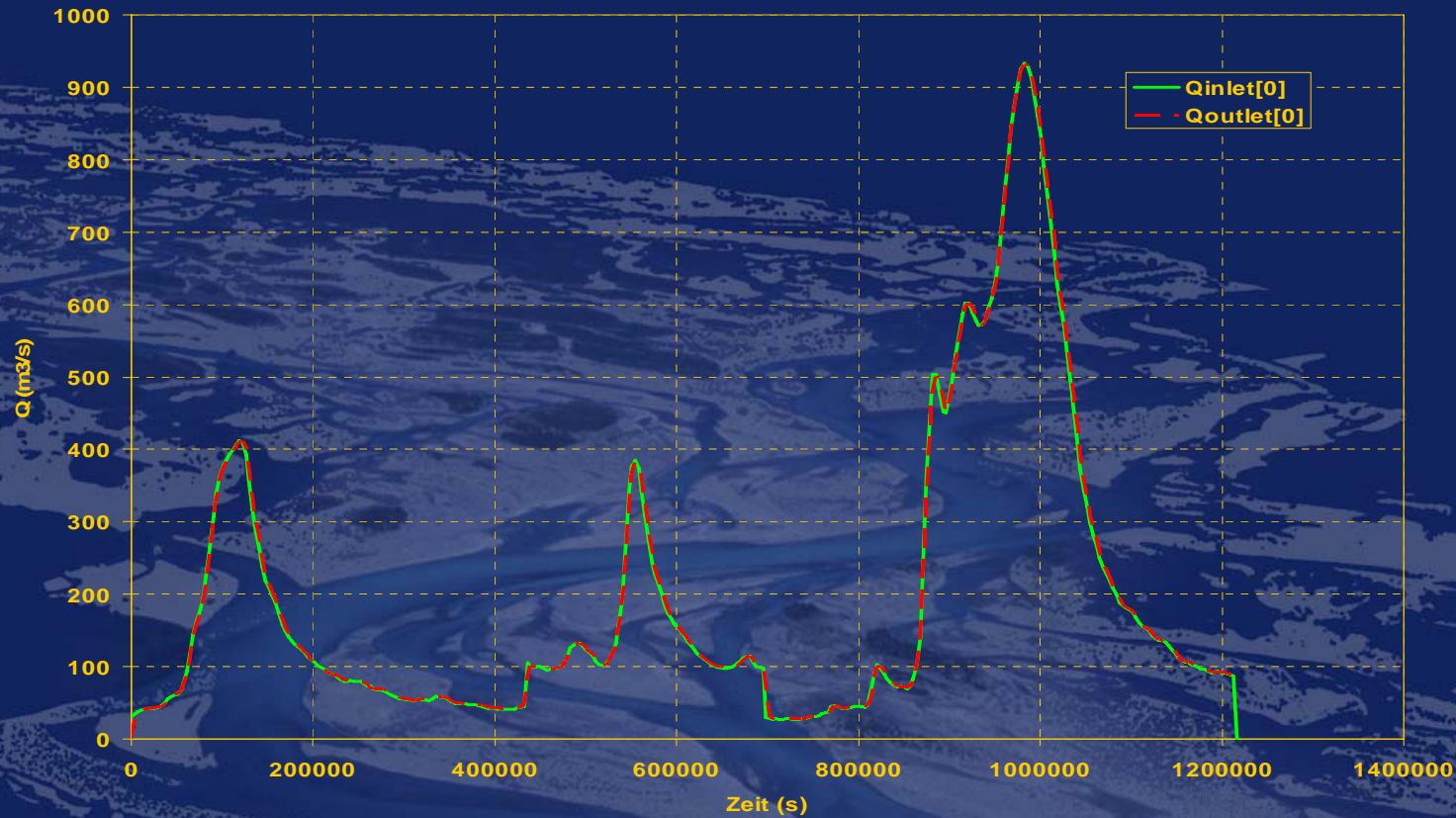
Resultate



Wassertiefe und Geschwindigkeitsvektoren
bei maximalem Abfluss 933 m³/s



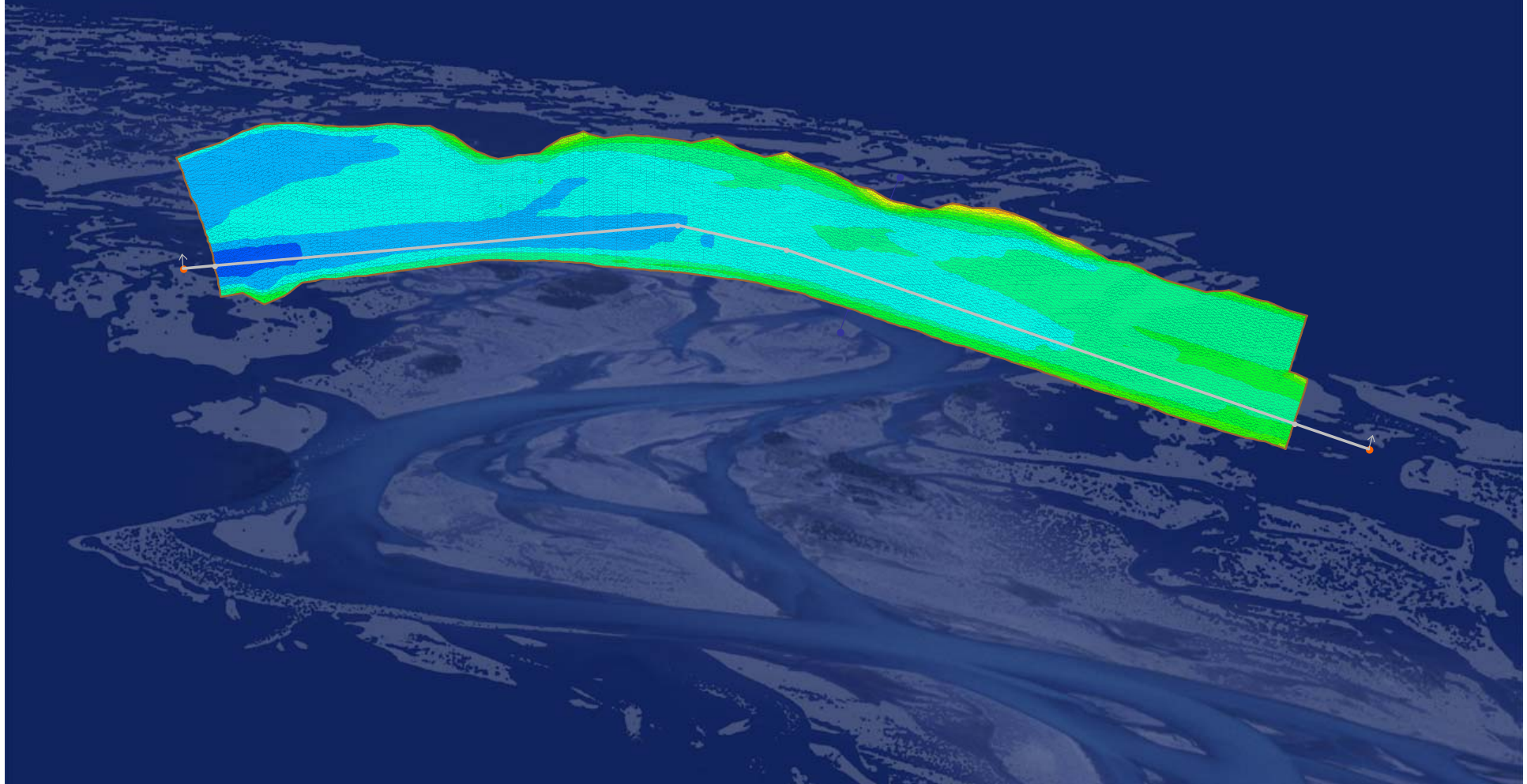
Resultate



Zufluss- und Abflusshydrograph



Resultate



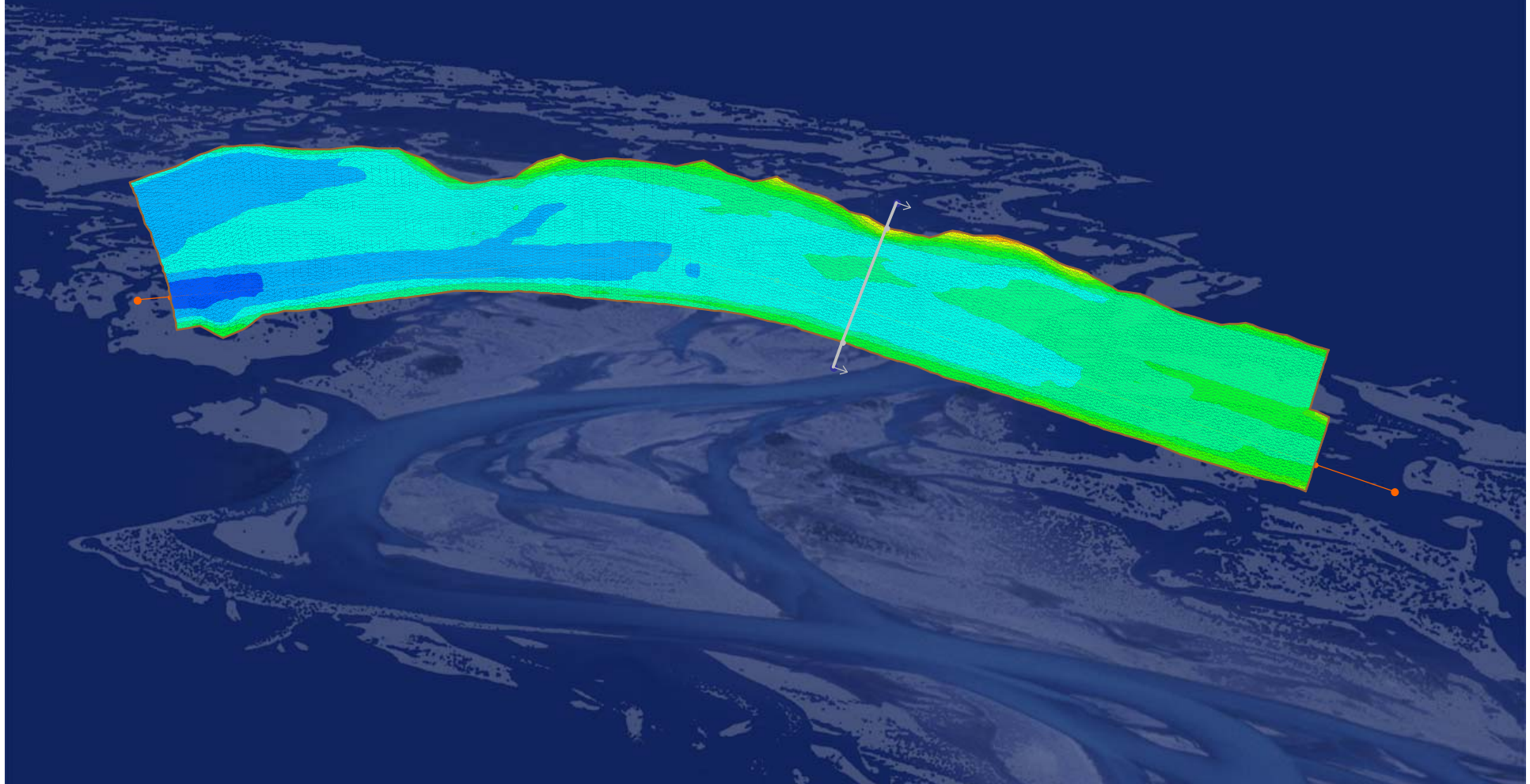


Resultate



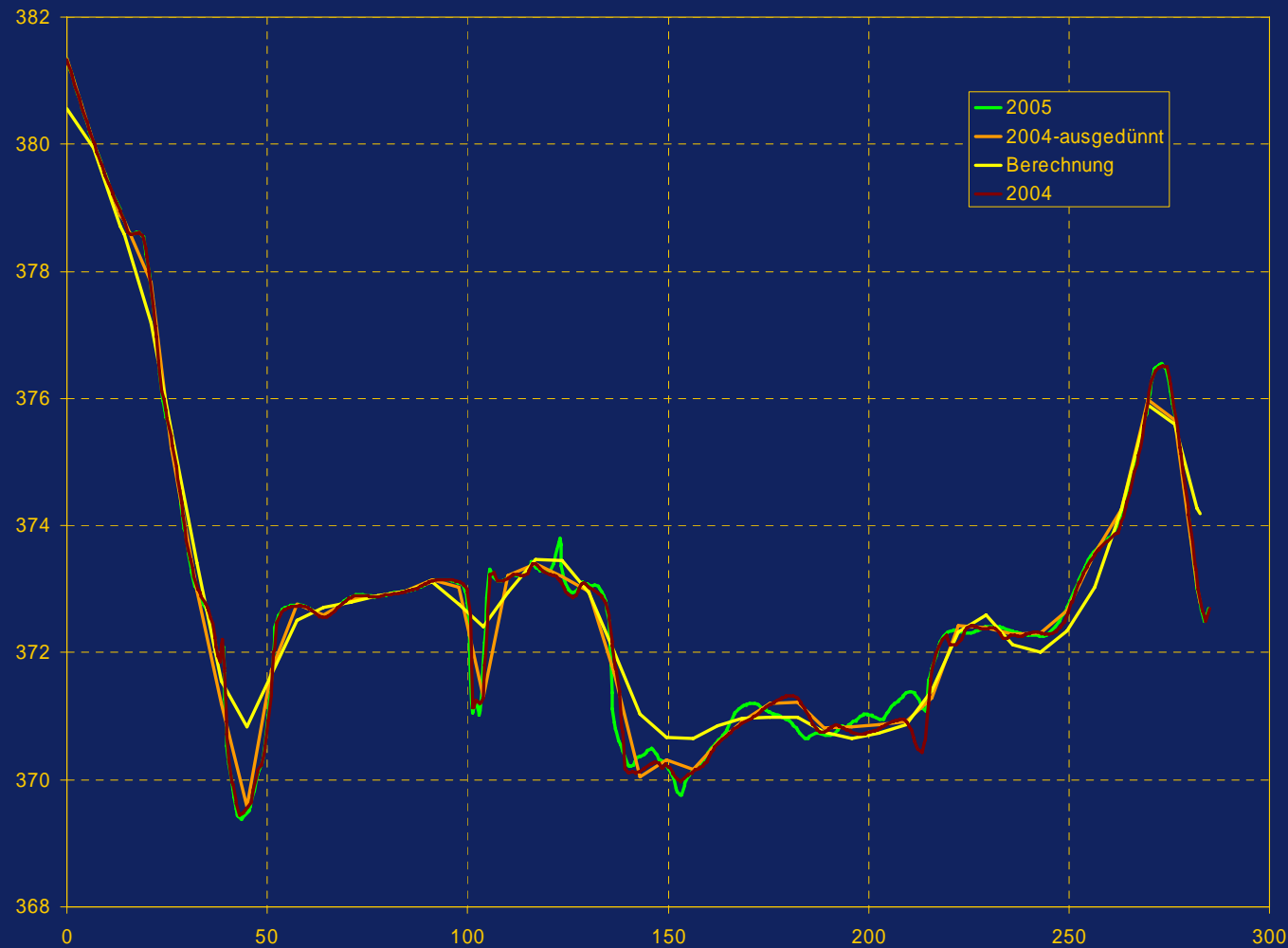


Resultate





Resultate





Probleme

Rechenzeit : im Falle einer morphologischen Berechnung ist sie noch gross!

Kalibrierung: Wasserspiegellage in der berechneten Strecke? => Keine Rauheitskalibrierung!

Geschiebezugabe: Immer ein grosses Problem! 1D-Berechnungsergebnisse => Input für 2D



Zusammenfassung

Die Datenvorbereitung für eine Berechnung anhand von einem Fallbeispiel

Das Gewicht und die Bedeutung des Material-Indizes

Vorläufige Ergebnisse und deren Interpretation

Probleme, von denen einige in kommenden Versionen behandelt werden



Danke Für Ihre Aufmerksamkeit!

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