

# GRD Extractor

## 1. Introduction

This program extracts .grd files into a text file which can then be added to an excel sheet for analysis. The user can specify the year and the grid points of their choice. This program has been written in C++. Prior to running the program, certain procedures are to be performed to initialise the program directories and input data sets. In addition to the input grid files, two input files (lat.txt and lon.txt), containing information regarding data points are to be created. The following section elaborates the instructions and point extraction procedures to create lat.txt and lon.txt files.

*(The user is solely responsible for the data extracted. It is recommended that the data extracted be checked before being used for analysis)*

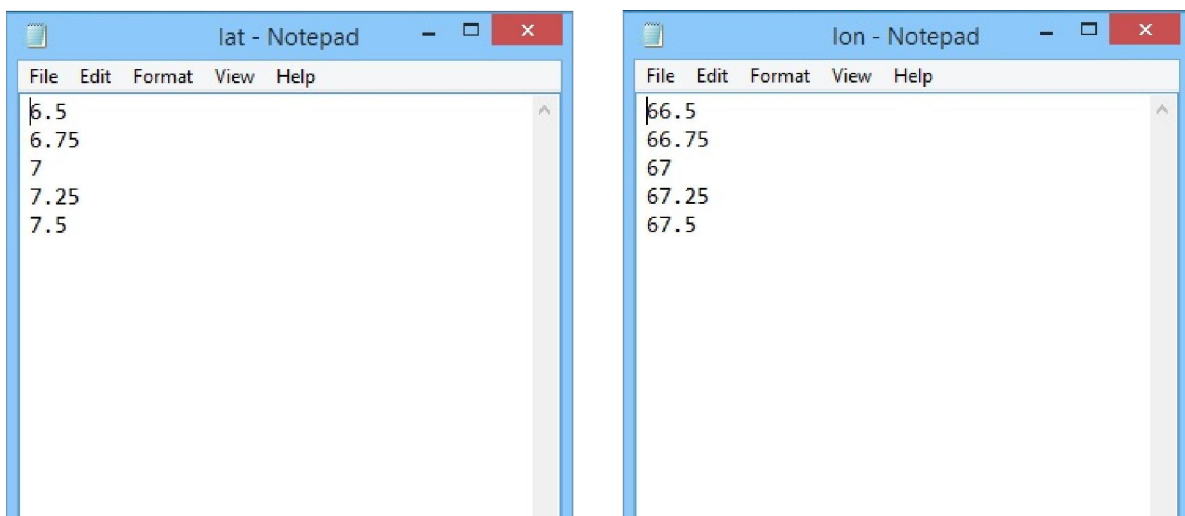
## 2. Instructions

- Create a new folder in your C drive and name it GRD.
- Copy all the Grid file to this location.
- Make sure that the grid files are named as “ind\*\*\*\*\_rfp25.grd”, where \*\*\*\* is the corresponding year. *Example: - ind2013\_rfp25.grd, this is the grid file for 2013.*
- Now you need to add the input file lat.txt and lon.txt to this directory. The instructions for creating these files are explained in section 3.
- Now run the program file *GRD Extract.exe*.

## 3. Creating the input files

The lat.txt and lon.txt contains the latitude and longitudes of the area of interest (AOI). If the user has prior knowledge of the required latitude and longitude, these input files can be created as shown below, however the input latitudes and longitudes should be according to the points available in the gridded data set. The data set contains 135 longitudinal points starting at 66.5 with an increment of 0.25 degrees. This means that data at longitudes 66.8 is not a valid input. Similarly there are 129 latitudinal points starting from 6.5 with an increment of 0.25 degrees.

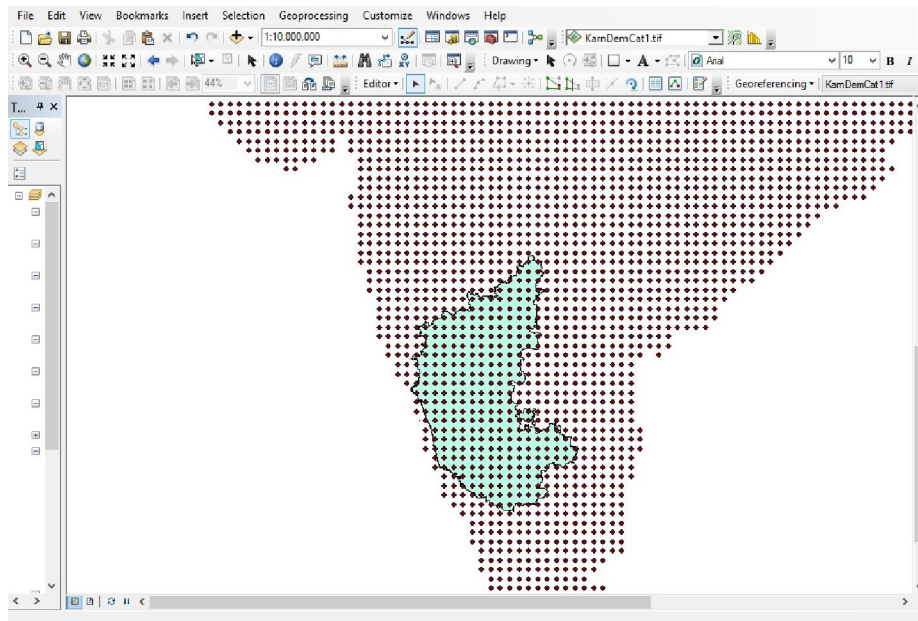
Suppose there are five points within the AOI say 1. (6.5(lat),66.5(lon)), 2. (6.75,66.75), 3. (7,67), 4. (7.25,67.25) and 5. (7.5, 67.5), the corresponding lat.txt and lon.txt should be as shown in figure 1.



**Figure 1:** lat.txt and lon.txt for the mentioned AOI.

In case if the user doesn't know the locations of the points within their AOI, the following steps describes a way of identifying the points. For visualizing the points within the AOI ArcGIS is used.

- Open your AOI in Esri ArcGIS.
- Now copy the shapefile grid location folder provided with this program to your ArcGIS connected folder.
- The folder contains a shapefile "Grid Location" containing all the data points in the 0.25\*0.25 degree gridded rainfall dataset from IMD. Add this to your ArcGIS project.
- Now you can see the grid points with in your AOI. See figure 2.



**Figure 2:** 0.25\*0.25 degree rainfall grid points with in Karnataka.

- Now start editing your grid points from the editor options.
- Select all the points within your AOI. You can press and hold the shift key to select multiple points.
- Now open the attribute table and copy the selected points. See figure 3.

Table				
Grid Location				
FID	Shape	Longitude	Latitude	Rainfall
468	Point	75.25	15	0
469	Point	75.5	15	2.5
470	Point	75.75	15	0.3
471	Point	76	15	0
472	Point	76.25	15	0
473	Point	76.5	15	0
474	Point	76.75	15	0
475	Point	77	15	0
476	Point	77.25	15	0
477	Point	77.5	15	0
478	Point	77.75	15	0
479	Point	78	15	0
480	Point	78.25	15	0
481	Point	78.5	15	0
482	Point	78.75	15	0
483	Point	79	15	0
484	Point	79.25	15	0
485	Point	79.5	15	0
486	Point	79.75	15	0
487	Point	80	15	0
488	Point	80.25	15	0
489	Point	80.5	15	0
490	Point	80.75	15	0
491	Point	81	15	0
492	Point	81.25	15	0
493	Point	81.5	15	0
494	Point	81.75	15	0
495	Point	82	15	0
496	Point	82.25	15	0
497	Point	82.5	15	0
498	Point	82.75	15	0
499	Point	83	15	0
500	Point	83.25	15	0
501	Point	83.5	15	0
502	Point	83.75	15	0
503	Point	84	15	0
504	Point	84.25	15	0
505	Point	84.5	15	0
506	Point	84.75	15	0
507	Point	85	15	0
508	Point	85.25	15	0
509	Point	85.5	15	0
510	Point	85.75	15	0
511	Point	86	15	0
512	Point	86.25	15	0
513	Point	86.5	15	0
514	Point	86.75	15	0
515	Point	87	15	0
516	Point	87.25	15	0
517	Point	87.5	15	0
518	Point	87.75	15	0
519	Point	88	15	0
520	Point	88.25	15	0
521	Point	88.5	15	0
522	Point	88.75	15	0
523	Point	89	15	0
524	Point	89.25	15	0
525	Point	89.5	15	0
526	Point	89.75	15	0
527	Point	90	15	0
528	Point	90.25	15	0
529	Point	90.5	15	0
530	Point	90.75	15	0
531	Point	91	15	0
532	Point	91.25	15	0
533	Point	91.5	15	0
534	Point	91.75	15	0
535	Point	92	15	0
536	Point	92.25	15	0
537	Point	92.5	15	0
538	Point	92.75	15	0
539	Point	93	15	0
540	Point	93.25	15	0
541	Point	93.5	15	0
542	Point	93.75	15	0
543	Point	94	15	0
544	Point	94.25	15	0
545	Point	94.5	15	0
546	Point	94.75	15	0
547	Point	95	15	0
548	Point	95.25	15	0
549	Point	95.5	15	0
550	Point	95.75	15	0
551	Point	96	15	0
552	Point	96.25	15	0
553	Point	96.5	15	0
554	Point	96.75	15	0
555	Point	97	15	0
556	Point	97.25	15	0
557	Point	97.5	15	0
558	Point	97.75	15	0
559	Point	98	15	0
560	Point	98.25	15	0
561	Point	98.5	15	0
562	Point	98.75	15	0
563	Point	99	15	0
564	Point	99.25	15	0
565	Point	99.5	15	0
566	Point	99.75	15	0
567	Point	100	15	0
568	Point	100.25	15	0
569	Point	100.5	15	0
570	Point	100.75	15	0
571	Point	101	15	0
572	Point	101.25	15	0
573	Point	101.5	15	0
574	Point	101.75	15	0
575	Point	102	15	0
576	Point	102.25	15	0
577	Point	102.5	15	0
578	Point	102.75	15	0
579	Point	103	15	0
580	Point	103.25	15	0
581	Point	103.5	15	0
582	Point	103.75	15	0
583	Point	104	15	0
584	Point	104.25	15	0
585	Point	104.5	15	0
586	Point	104.75	15	0
587	Point	105	15	0
588	Point	105.25	15	0
589	Point	105.5	15	0
590	Point	105.75	15	0
591	Point	106	15	0
592	Point	106.25	15	0
593	Point	106.5	15	0
594	Point	106.75	15	0
595	Point	107	15	0
596	Point	107.25	15	0
597	Point	107.5	15	0
598	Point	107.75	15	0
599	Point	108	15	0
600	Point	108.25	15	0
601	Point	108.5	15	0
602	Point	108.75	15	0
603	Point	109	15	0
604	Point	109.25	15	0
605	Point	109.5	15	0
606	Point	109.75	15	0
607	Point	110	15	0
608	Point	110.25	15	0
609	Point	110.5	15	0
610	Point	110.75	15	0
611	Point	111	15	0
612	Point	111.25	15	0
613	Point	111.5	15	0
614	Point	111.75	15	0
615	Point	112	15	0
616	Point	112.25	15	0
617	Point	112.5	15	0
618	Point	112.75	15	0
619	Point	113	15	0
620	Point	113.25	15	0
621	Point	113.5	15	0
622	Point	113.75	15	0
623	Point	114	15	0
624	Point	114.25	15	0
625	Point	114.5	15	0
626	Point	114.75	15	0
627	Point	115	15	0
628	Point	115.25	15	0
629	Point	115.5	15	0
630	Point	115.75	15	0
631	Point	116	15	0
632	Point	116.25	15	0
633	Point	116.5	15	0
634	Point	116.75	15	0
635	Point	117	15	0
636	Point	117.25	15	0
637	Point	117.5	15	0
638	Point	117.75	15	0
639	Point	118	15	0
640	Point	118.25	15	0
641	Point	118.5	15	0
642	Point	118.75	15	0
643	Point	119	15	0
644	Point	119.25	15	0
645	Point	119.5	15	0
646	Point	119.75	15	0
647	Point	120	15	0
648	Point	120.25	15	0
649	Point	120.5	15	0
650	Point	120.75	15	0
651	Point	121	15	0
652	Point	121.25	15	0
653	Point	121.5	15	0
654	Point	121.75	15	0
655	Point	122	15	0
656	Point	122.25	15	0
657	Point	122.5	15	0
658	Point	122.75	15	0
659	Point	123	15	0
660	Point	123.25	15	0
661	Point	123.5	15	0
662	Point	123.75	15	0
663	Point	124	15	0
664	Point	124.25	15	0
665	Point	124.5	15	0
666	Point	124.75	15	0
667	Point	125	15	0
668	Point	125.25	15	0
669	Point	125.5	15	0
670	Point	125.75	15	0
671	Point	126	15	0
672	Point	126.25	15	0
673	Point	126.5	15	0
674	Point	126.75	15	0
675	Point	127	15	0
676	Point	127.25	15	0
677	Point	127.5	15	0
678	Point	127.75	15	0
679	Point	128	15	0
680	Point	128.25	15	0
681	Point	128.5	15	0
682	Point	128.75	15	0
683	Point	129	15	0
684	Point	129.25	15	0
685	Point	129.5	15	0
686	Point	129.75	15	0
687	Point	130	15	0
688	Point	130.25	15	0
689	Point	130.5	15	0
690	Point	130.75	15	0
691	Point	131	15	0
692	Point	131.25	15	0
693	Point	131.5	15	0
694	Point	131.75	15	0
695	Point	132	15	0
696	Point	132.25	15	0
697	Point	132.5	15	0
698	Point	132.75	15	0
699	Point	133	15	0
700	Point	133.25	15	0
701	Point	133.5	15	0
702	Point	133.75	15	0
703	Point	134	15	0
704	Point	134.25	15	0
705	Point	134.5	15	0
706	Point	134.75	15	0
707	Point	135	15	0
708	Point	135.25	15	0
709	Point	135.5	15	0
710	Point	135.75	15	0
711	Point	136	15	0
712	Point	136.25	15	0
713	Point	136.5	15	0
714	Point	136.75	15	0
715	Point	137	15	0
716	Point	137.25	15	0
717	Point	137.5	15	0
718	Point	137.75	15	0
719	Point	138	15	0
720	Point	138.25	15	0
721	Point	138.5	15	0
722	Point	138.75	15	0
723	Point	139	15	0
724	Point	139.25	15	0
725	Point	139.5	15	0
726	Point	139.75	15	0
727	Point	140	15	0
728	Point	140.25	15	0
729	Point	140.5	15	0
730	Point	140.75	15	0
731	Point	141	15	0
732	Point	141.25	15	0
733	Point	141.5	15	0
734	Point	141.75	15	0
735	Point	142	15	0
736	Point	142.25	15	0
737	Point	142.5	15	0
738	Point	142.75	15	0
739	Point	143	15	0
740	Point	143.25	15	0
741	Point	143.5	15	0
742	Point	143.75	15	0
743	Point	144	15	0
744	Point	144.25	15	0
745	Point	144.5	15	0
746	Point	144.75	15	0
747	Point	145	15	0
748	Point	145.25	15	0
749	Point	145.5	15	0
750	Point	145.75	15	0
751	Point	146	15	0
752	Point	146.25	15	0
753	Point	146.5	15	0
754	Point	146.75	15	0
755	Point	147	15	0
756	Point	147.25	15	0
757	Point	147.5	15	0
758	Point	147.75	15	0
759	Point	148	15	0
760	Point	148.25	15	0
761	Point	148.5	15	0
762	Point	148.75	15	0
763	Point	149	15	0
764	Point	149.25	15	0
765	Point	149.5	15	0
766	Point	149.75	15	0
767	Point	150	15	0
768	Point	150.25	15	0
769				

- Now open a new text file and paste these values.
- You will get the latitudes and longitudes for your AOI.
- Now you could create the lat.txt and lon.txt as described earlier. See figure 1.

#### 4. Output file

- Once the input files are prepared the program *GRD Extract.exe* can be executed. Follow the onscreen instructions to finish the extraction.
- After successful extraction the GRD folder now contains output text file for each year with the name format as rfp\_\*\*\*\*.txt, where \*\*\*\* corresponds to the particular year. Example: - rfp\_2013.txt is the output file for the year 2013.
- Open the output text file and copy the contents to an excel sheet.
- Each row corresponds to the data for 01/01/year, and each column corresponds to the locations in the order as given in your lat.txt and lon.txt files.
- You can also add a date column to the left and a point row to the top for convenience. See figure 4.
- *However, the data locations may not be in the order of your lat lon input, but will be such that the bottom left point is first and the top right point is the last location in the excel sheet.*

Location	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
01-01-2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02-01-2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03-01-2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04-01-2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05-01-2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06-01-2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07-01-2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08-01-2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09-01-2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10-01-2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11-01-2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12-01-2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13-01-2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14-01-2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-01-2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-01-2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-01-2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18-01-2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19-01-2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20-01-2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21-01-2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22-01-2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23-01-2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24-01-2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25-01-2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26-01-2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27-01-2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**Figure 4: Data extracted to excel sheet.**

*(The user is solely responsible for the data extracted. It is recommended that the data extracted be checked before being used for analysis)*

The program has been coded by *Sinan Nizar*, Research scholar NITK-Surathkal ([zinan.dx@gmail.com](mailto:zinan.dx@gmail.com)). Enjoy!!