Working with Data
A Workshop on Understanding, Visualising and Mapping Data
Chennai, 3-5 August 2012

First day
3rd August 2012

1. What is data?	[10:30-11:15]
2. What are data formats?	[11:30-12:00]
3. Presentation by Prajnya	[12:15-12:45]
4. What can be done with data?	[14:00-14:45]
5. Working with quantitative data	[15:00-15:45]
6. Working with spatial data	[16:00-16:45]

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6. Working with spatial data	**[16:00-16:45]**

Spatial Data Formats

Common Spatial Data Formats

Raster		Vector	
ASCII	(.asc)	Shapefile	(.shp)
GeoTIFF	(.tif)	GeoJSON	(.json)
		Keyhole Markup Language	(.kml)

Common Spatial Data Formats

Raster   Vector

ASCII   (.asc)   Shapefile   (.shp)

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                                 Keyhole Markup   (.kml)
                                 Language

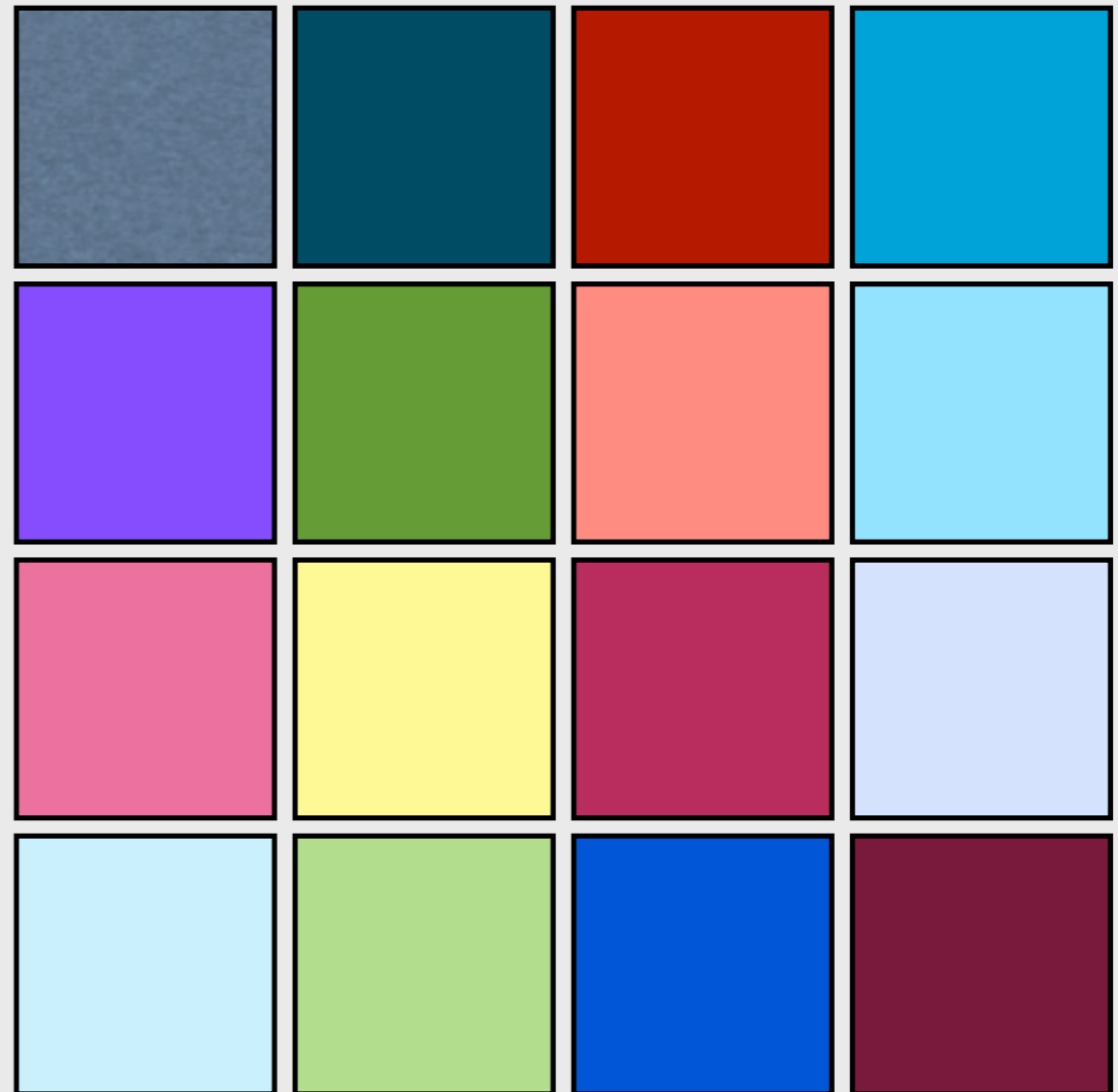# Raster Spatial Data

Grid Cell Data

Row and Column
[X / Y / (Z)]

Single Attribute

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ASCII

Basic text

```
ncols            6000
nrows            6000
xllcorner        65
yllcorner        25
cellsize         0.00083333333333333
NODATA_value     -9999
967 957 951 955 947 948 953 956 953 954 963 970 975 957 950 946 942 944
966 955 953 945 936 935 944 952 956 960 963 965 964 968 971 970 962 964
973 969 950 933 928 925 923 925 927 931 938 937 936 937 940 941 944 951
967 964 966 962 961 970 976 976 971 963 966 960 954 951 946 947 952 948
956 959 958 962 960 962 965 962 955 957 956 953 956 964 970 969 968 969
957 950 945 954 960 961 965 963 963 966 968 978 986 995 997 994 994 994
989 987 995 994 994 994 988 985 984 984 980 979 975 978 975 977 979 977
977 978 977 969 968 971 969 967 963 963 969 967 965 965 963 963 965 967
998 997 993 990 987 976 967 965 961 964 964 963 964 965 965 971 977 980
971 973 975 973 968 965 968 973 973 968 970 967 971 975 979 980 985 987
986 988 989 991 993 993 982 979 980 983 986 987 985 978 971 970 966 966
977 982 985 983 987 989 987 982 976 977 978 978 976 975 975 973 975 975
970 976 979 982 978 971 968 974 976 981 982 982 980 988 989 994 992 986
989 990 993 995 998 999 1000 1001 991 979 977 977 981 982 981 985 989 9
986 985 977 969 971 975 984 989 985 990 993 998 1001 1002 1009 1007 100
1009 1008 1004 1004 1006 1004 1003 1005 1002 998 992 995 997 996 997 10
```

ASCII

ncols	6000	← data columns
nrows	6000	← data rows
xllcorner	65	← lower left X coordinate
yllcorner	25	← lower left Y coordinate
cellsize	0.00083333333333333	
NODATA_value	-9999	

```
967 957 951 955 947 948 953 956 953 954 963 970 97
966 955 953 945 936 935 944 952 956 960 963 965 96
973 969 950 933 928 925 923 925 927 931 938 937 93
967 964 966 962 961 970 976 976 971 963 966 960 95
956 959 958 962 960 962 965 962 955 957 956 953 95
957 950 945 954 960 961 965 963 963 966 968 978 98
989 987 995 994 994 994 988 985 984 984 980 979 97
977 978 977 969 968 971 969 967 963 963 969 967 96
998 997 993 990 987 976 967 965 961 964 964 963 96
```

Common Spatial Data Formats

Raster   Vector

ASCII   (.asc)   Shapefile   (.shp)

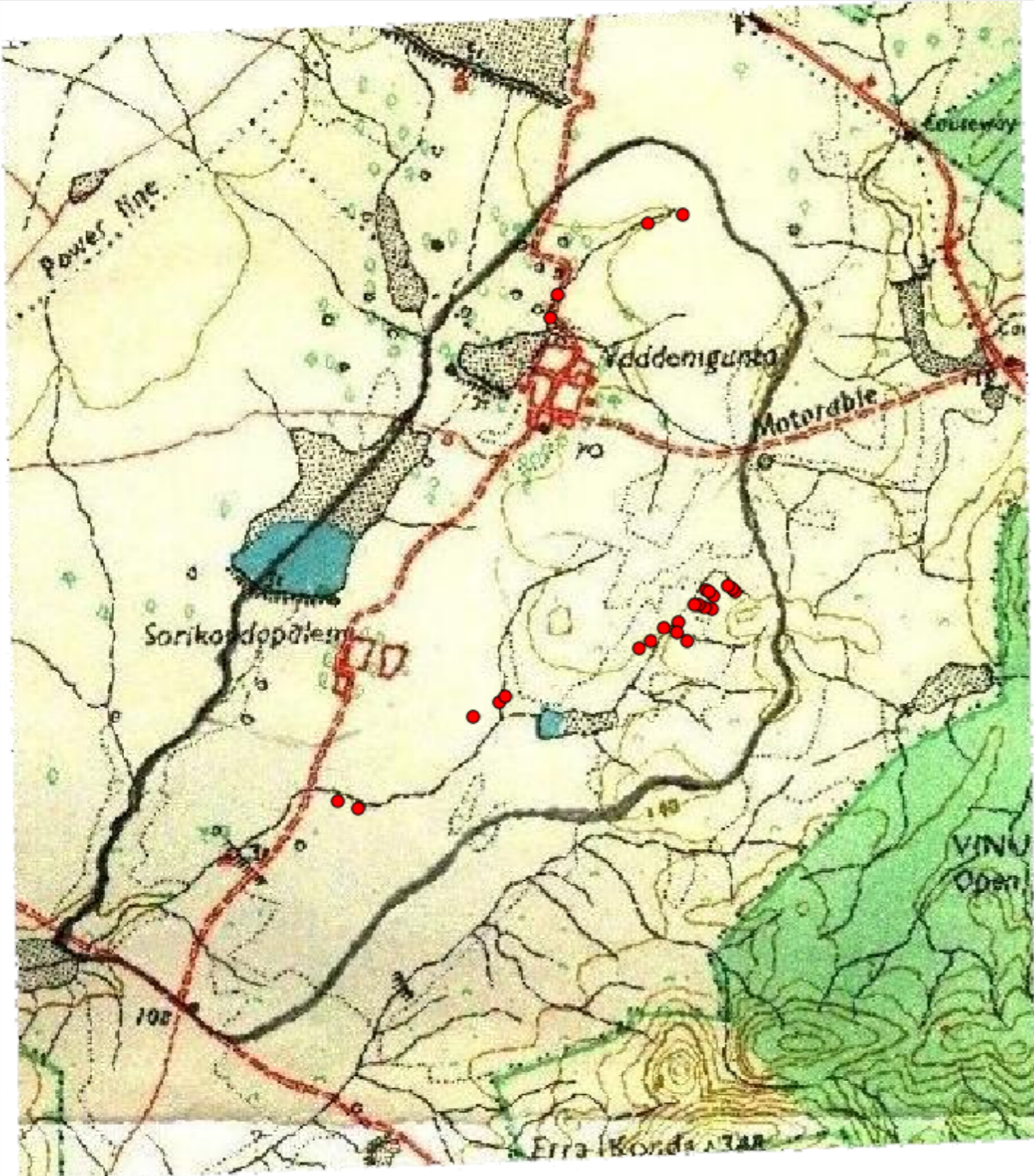**GeoTIFF**   (.tif)   GeoJSON   (.json)
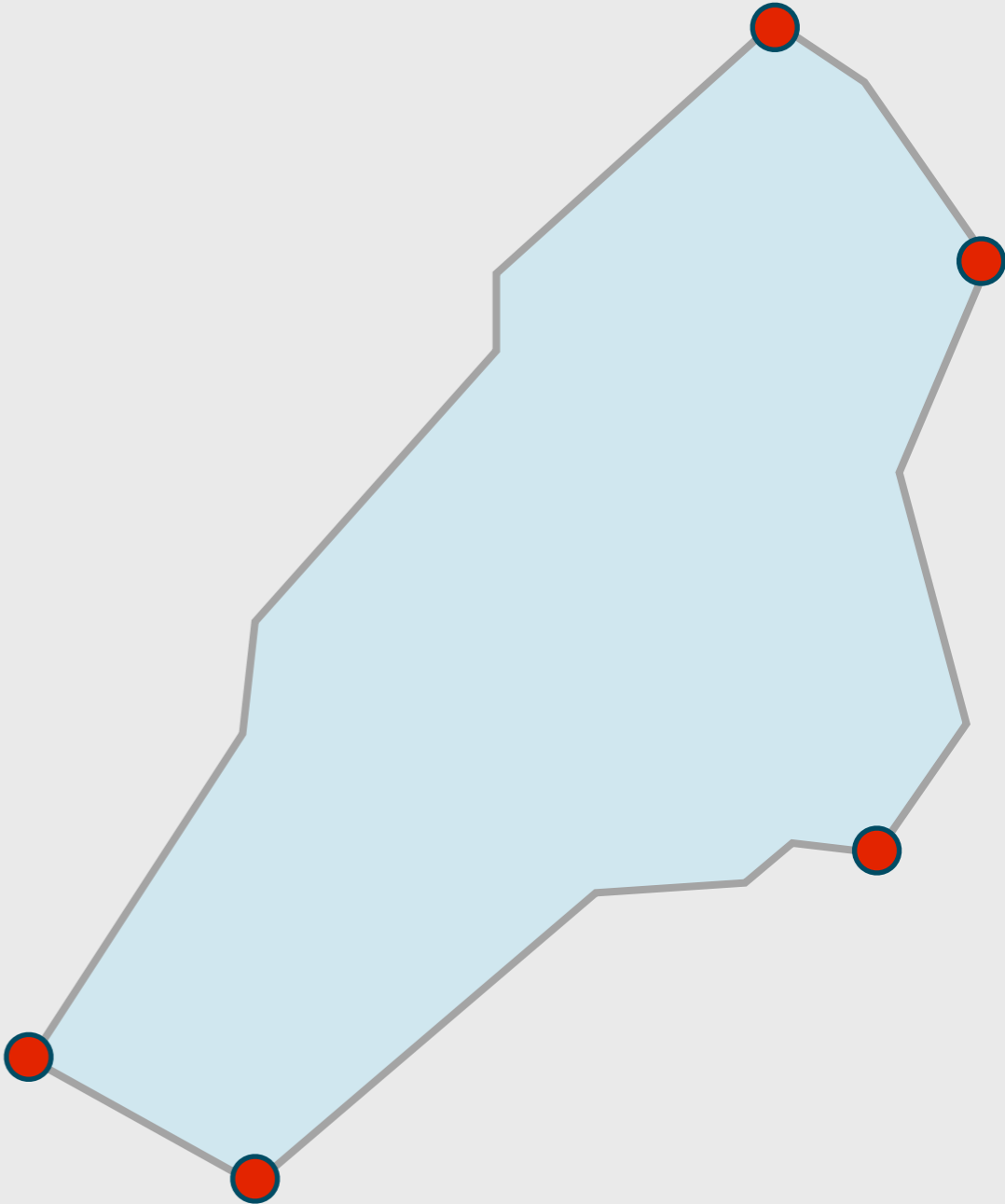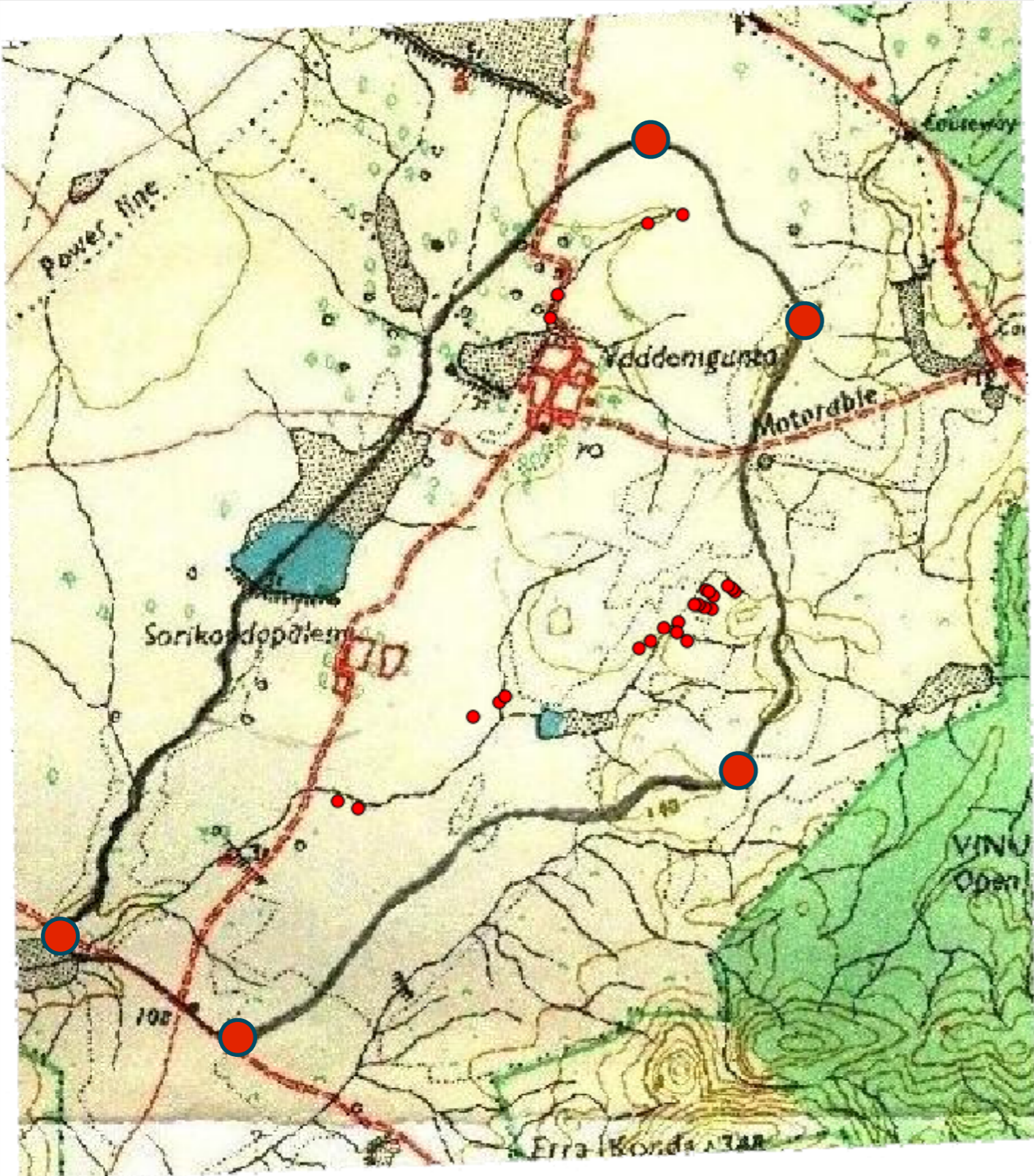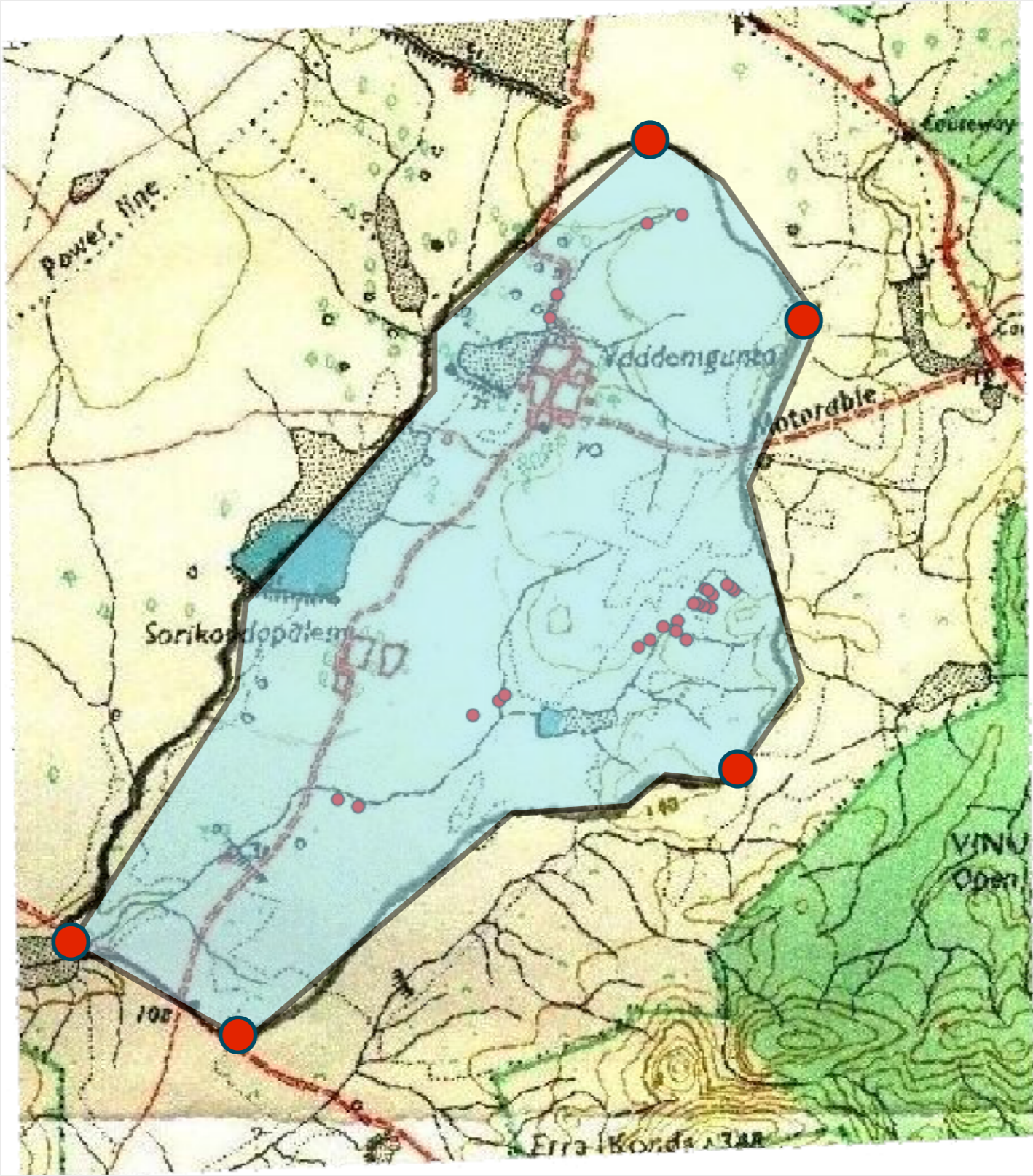
                                Keyhole Markup   (.kml)
                                Language

GeoTIFF

Image with spatial attributes

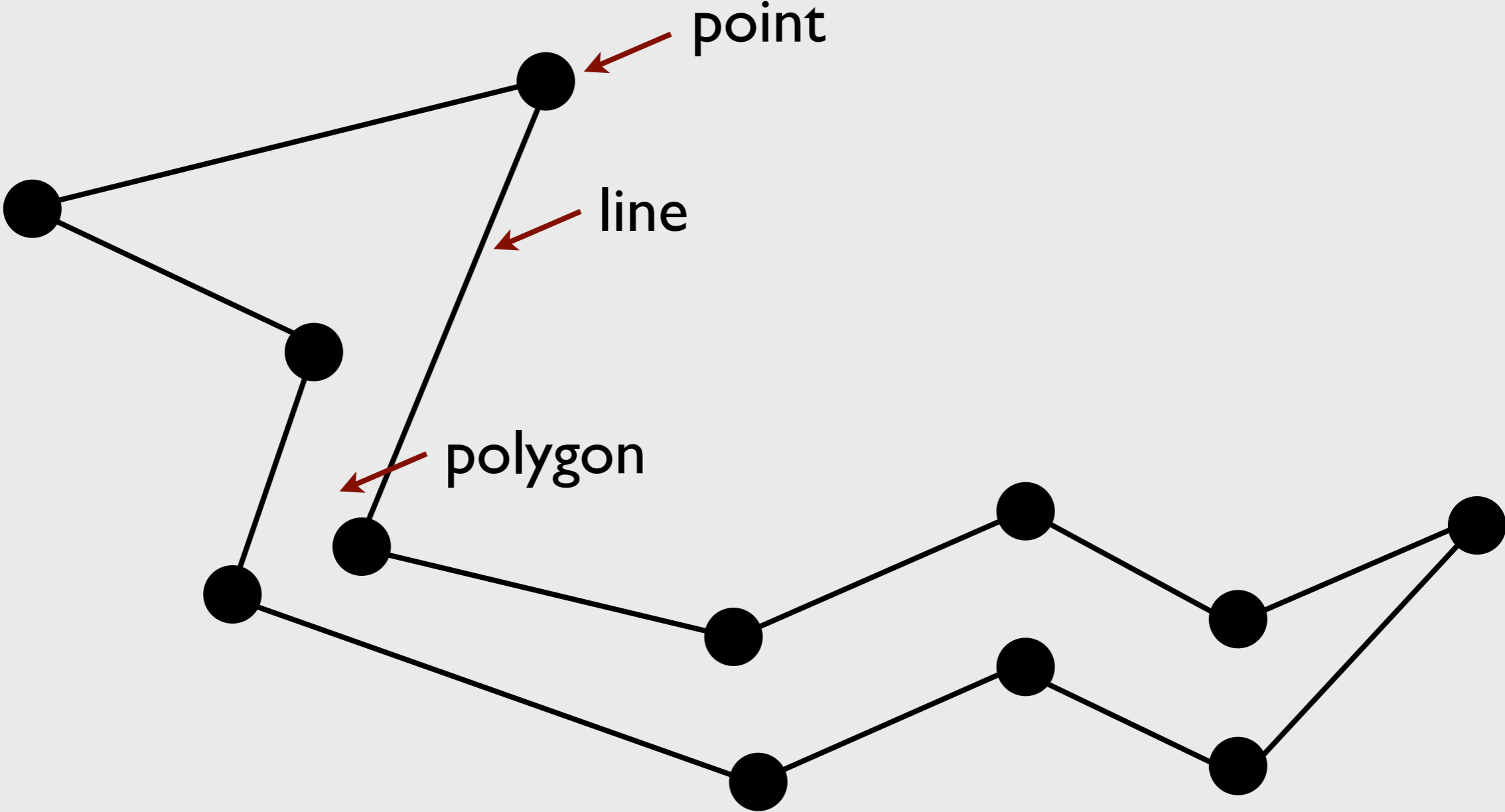# GeoTIFF

GeoTIFF

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GeoTIFF	(.tif)	GeoJSON	(.json)
		Keyhole Markup Language	(.kml)

Vector Spatial Data

Common Spatial Data Formats

Raster		Vector	
ASCII	(.asc)	**Shapefile**	(.shp)
GeoTIFF	(.tif)	GeoJSON	(.json)
		Keyhole Markup Language	(.kml)

Shapefile

Shapefile Components

.shp   **Feature geometry and position**

.dbf   **Feature and attribute data**

.shx   **Links the .shp and .dbf files**

.prj   **Projection information**

Coordinate Reference System

Common Spatial Data Formats

Raster   Vector

ASCII   (.asc)   Shapefile   (.shp)

GeoTIFF   (.tif)   **GeoJSON**   (.json)

Keyhole Markup   (.kml)
Language

GeoJSON   (Geo)JavaScript Object Notation

```
{ "type": "FeatureCollection",
  "features": [
    { "type": "Feature",
      "geometry": {"type": "Point",
"coordinates": [102.0, 0.5]},
      "properties": {"prop0":
"value0"}
    },
    { "type": "Feature",
      "geometry": {
        "type": "LineString",
        "coordinates": [
          [102.0, 0.0], [103.0,
1.0], [104.0, 0.0], [105.0, 1.0]
          ]
      },
      "properties": {
        "prop0": "value0",
        "prop1": 0.0
        }
      },
    { "type": "Feature",
      "geometry": {
        "type": "Polygon",
        "coordinates": [
          [ [100.0, 0.0], [101.0,
0.0], [101.0, 1.0],
            [100.0, 1.0], [100.0,
0.0] ]
          ]
      },
      "properties": {
        "prop0": "value0",
        "prop1": {"this": "that"}
        }
      }
    ]
  }
```

```
{ "type": "FeatureCollection",
  "features": [
    { "type": "Feature",
      "geometry": {"type": "Point",
"coordinates": [102.0, 0.5]},
      "properties": {"prop0":
"value0"}
    },
    { "type": "Feature",
      "geometry": {
        "type": "LineString",
        "coordinates": [
          [102.0, 0.0], [103.0,
1.0], [104.0, 0.0], [105.0, 1.0]
          ]
      },
      "properties": {
        "prop0": "value0",
        "prop1": 0.0
        }
      },
    { "type": "Feature",
      "geometry": {
        "type": "Polygon",
        "coordinates": [
          [ [100.0, 0.0], [101.0,
0.0], [101.0, 1.0],
            [100.0, 1.0], [100.0,
0.0] ]
          ]
      },
      "properties": {
        "prop0": "value0",
        "prop1": {"this": "that"}
        }
      }
    ]
  }
```

```
{ "type": "FeatureCollection",
  "features": [
    { "type": "Feature",
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      "properties": {"prop0":
"value0"}
    },
    { "type": "Feature",
      "geometry": {
        "type": "LineString",
        "coordinates": [
          [102.0, 0.0], [103.0,
1.0], [104.0, 0.0], [105.0, 1.0]
          ]
      },
      "properties": {
        "prop0": "value0",
        "prop1": 0.0
        }
      },
    { "type": "Feature",
      "geometry": {
        "type": "Polygon",
        "coordinates": [
          [ [100.0, 0.0], [101.0,
0.0], [101.0, 1.0],
            [100.0, 1.0], [100.0,
0.0] ]
          ]
      },
      "properties": {
        "prop0": "value0",
        "prop1": {"this": "that"}
        }
      }
    ]
  }
```

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                            Keyhole Markup (.kml)
                            Language

Keyhole Markup Language

(.kml) = (.kmz)