

GEODETTIC SURVEYING USES AN ELLIPSOIDAL EARTH MODEL

Reasons for using an ellipsoidal earth model:

- **The earth is not flat, neither is it perfectly spherical.**
- **Locations on the earth are given by latitude & longitude.**
- **Elevations are referenced to a curved level surface.**
 - 1. It used to be mean sea level.**
 - 2. Now elevations are referenced to an arbitrary surface.**
- **There is a difference between a horizontal plane and a level surface.**
 - 1. Difference is small for short distances.**
 - 2. Difference can not be tolerated:**
 - for precise surveys.**
 - over long distances.**

Traditional models in geodesy include:

- **Horizontal datums**
 - 1. Regional datums - best fit for given area of earth (NAD27).**
 - 2. Global datums - best fit for entire earth (NAD83).**
- **Vertical datums**
 - 1. Geoid - mean sea level (most intuitive vertical reference).**
 - 2. Arbitrary equipotential level surface (NGVD29 & NAVD88).**
- **Map projections used to flatten the earth**
 - 1. State plane coordinates.**
 - 2. Distances are distorted.**
 - 3. Limited to 2-dimensions.**

Is there a better model? What characteristics should it have?