# Grand Tetons Google Earth

Welcome to the lesson on using Google Earth and viewing some of the features of Grand Tetons National Park in Google Earth. If you have Google Earth installed already and you double click on the .kmz file, the file will open within Google Earth and it will be show in Temporary Places, under Places. Perhaps the first thing you'll want to do is adjust the transparency. The overlays that I have provided here come-in in full force, but if you select the, in this case, the geologic map, which has map and key overlays, and you adjust the slider, you can set the transparency level to your pleasing. I like it about there. I like to see the aerial photo images more clearly than the geologic map. The next thing you want to do is make sure you can navigate. You can change the camera position here. You can plan with this one, and you can zoom here. You can do all of these with your mouse directly too if you click and drag with the left mouse button you can pan. If you click and drag with the right you can either zoom or rotate, and if you push the mouse wheel down and click and drag you can change the view and rotate as well. If you use the mouse wheel itself it will scroll in or out of the view. We're going to have to adjust the setup if you never have. So one of the first things we want to make sure that we do is go to our Layers and there are lots of things that you can check here, we don't to check all of these, but under geographic features here, open that one up and make sure Mountains and USA features are checked, and then very importantly make sure the Terrain feature is check down here. When that's done you can close the Layers and open up Places. Another thing we want to do is adjust the terrain quality. So under Tools, Options, 3D View, Terrain Quality, set that slider as high as you can while maintaining a reasonable level of performance within you Google Earth application. Depending on your video card and processor speed this will slo down the application. Set it as high as you can, but if it doesn't work then slide it on down. Under Cache, we want to set these as high as possible too, unless your computer doesn't have a lot of memory. Play around with that and see how it works. Let's apply that, OK. When you load a .kmz file it ends up in your temporary places. If you just click on any of these it will show the view for that folder. If you click on this button it will take you on a tour through all the various places within that folder and its subfolders. I going to show you how to follow the tour that will take you through all the places within the kmz file here. If you click on the main folder heading here and then hit this button it will take you on a tour. We are going to do that right now. In this file you have a geologic map which I've adjusted the transparency of, and next to that I also have the key to that geologic map. If you like you can make that more opaque so you can read it better. There's also a cross section down here. We're going to take a look at some of the faults first. This of course is the Teton Fault. I'm going to pause it there for a second. You can see that like most normal faults, uplifted the block below the fault creating the Grand Tetons' very steep eastern fault scarp, and then lowered the basin relative to that. The basin block here would be the hanging wall - that is on top of the fault plane. On the other side of the fault we have those Paleozoic sedimentary rocks which are gently tilted, or dipping, to the west here. You can see that if you extend their continuity to the east, they'd run right into the Grand Teton mountain right here. The sedimentary rocks should be on top of this mountain, which means that there must be another fault in between these which has uplifted Grand Teton Mountain relative to these sedimentary rocks. That fault is a reverse fault called the Buck Mountain Fault, which has lowered the west side and uplifted the east side. The Buck Mountain Fault is from an earlier period of mountain building. It's Laramide in age which is early Cenozoic from compressional stresses. There are other reverse faults in the area. On the eastern side the Spread Creek fault is one of those, and if we look at the cross section through that you can see that, as is typical of reverse faults, the compression tends to fold the layers against the fault such that they make a little upward fold, or what we call an anticline. That folding tilts the layers both towards and away from the fault, and that's important because the same kind of thing happened here on the flat creek fault. Here's the anticline where the layers are tilted towards the fault and then away from the fault here. That tilt away from the fault creates a series of layers that are tilted to the northeast towards the Gros Ventre River. That created a bad situation because eventually the river undermined the support holding those layers up and that combined with saturated rocks led to the Gros Ventre landslide is 1925. It formed this dam making lower slide lake, which broke through the dam about two years later, wiped out the town of Kelly, WY, and killed six people at the time. I'm going to turn of the landslide and fault information here. We're going to start looking at some of the glacial landforms. The U-shaped valleys are very clear here, of course there are no glaciers now in those valleys, but if you look high up in the mountains you can see some small Cirque glaciers at the head of those U-shaped valleys. They're of the Alpine type. I'm going to shut off the geologic map now so we can see these glacial features a little better. There are lots of these little glaciers at the head of the valleys. Remember that the glaciers push a lot of debris to the side, creating moraines. We'll get lateral or side moraines as well as the end moraines or terminal moraines. The terminal moraines often dam-up the rivers coming out of the valleys and lead to terminal moraine lakes at the base of the Grand Tetons. We also have recessional moraines as the glacier is retreating. In this case the recessional moraine of the main piedmont glacier (remember piedmont glaciers spill out into the basin, they are not confined to valleys) dammed this area and created Jackson lake. As the glaciers melt, they spread a lot of material out into what we call the outwash plain. Occasionally within that outwash plain various stranded, buried and melted ice blocks will form kettles.