Area Geology

Last Updated Friday, 25 July 2008

The Ice Age Floods During the last 1-2 million years, there have been a large number of cooling periods resulting in extensive periods of glaciations over large portions of North America. The last cooling began about 30,000 years ago and ended about 15,000 years ago. There is evidence of Ice Age flooding from a number of these periods of glaciations. This last glaciations produced an ice sheet that covered much of Canada. The average depth of ice at the U.S. / Canadian border was 5,000 feet thick. A portion of the Cordilleran Ice Sheet crept south into the U.S. and blocked the Clark Fork River Valley, near Sandpoint, Idaho. The resultant lake backed up behind this ice dam which contained as much as 530 cubic miles of water. Periodically, the ice dam would fail, and the flood waters would begin their race to the sea. The water emptied from glacial Lake Missoula in as few as 48 hours. The finger of the ice sheet would continue to move south and would again fill in the valley of the Clark Fork River. Again, the water would back up forming another glacial Lake Missoula. The ice dam would eventually fail, and this flood sequence would be repeated. Some geologists believe that this situation repeated itself as many as 100 times during this last glacial cycle alone. The flood waters from glacial Lake Missoula generally came down the Grand Coulee, Telford-Crab Creek drainage, and the Cheney-Palouse route. Regardless of which way the flood waters went, they all met at Wallula Gap by Pasco. These converging flood waters overwhelmed Wallula Gap's ability to accommodate the deluge. The flood waters quickly backed up to a depth of 900 feet. These waters backed up the Snake River valley over 100 miles. The waters flooded the Pasco Basin, the Yakima and Walla Walla river valleys and the Othello and Quincy Basins. This enormous ponding is known as Lake Lewis. Lake Lewis only lasted about a week or less, before these flood waters could drain through Wallula Gap. During this week or less, however, the muddy water deposited a graded layer of sand and silt on the floors of this lake. The multiple floods, with their multiple pondings from Lake Lewis, are responsible for much of the fertile top soils found here in the Quincy Basin. Recent geological models suggest that as much as three times more water than existed in glacial Lake Missoula is needed to produce the flood features found in the Channeled Scablands. There is a growing body of evidence showing how considerable amounts of melt water can accumulate under ice sheets and the release of this water is often cataclysmic. Perhaps we will find that the giant Cordilleran Ice Sheet to the north would periodically release great amounts of melt water that could augment the floods from glacial Lake Missoula. Clearly, there is much to learn about the ice age floods story. It will be fascinating to see this story unfold, as more research uncovers additional details about this great geological event. The Columbia River Basalt Group Seventeen million years ago, huge amounts of molten basalt poured across the countryside. These eruptions were located in a 150 square mile area in S.E. Washington, N.E. Oregon, and Western Idaho. There were approximately 300 different eruptions. These eruptions stopped about 6 million years ago. These flows eventually covered 50,000 square miles. Over 20 of these flows reached the Pacific Ocean. In the Tri-Cities area, the basalt is 2 ½ miles thick. The lava flows that occurred from 17 to 14 ½ million years ago represented a high percentage of the total amount of lava produced. These early flows were not only larger and covered more area than the later flows, they were also more frequent. These early flows were approximately 10,000 years apart. The later, smaller flows were often hundreds of thousands of years apart. During the long periods of time between these later flows, rivers deposited much sediment and formed shallow lakes in the low areas found on the surface of the previous flow. Regional tectonic forces; before the great lava flows began, stretched and fractured the crust while forming the Columbia Basin. These effects enabled the magma to more easily reach the surface and thereby contributed to its non-explosive eruptions. In addition, the magma's low silica content and low amounts of explosive gases, also contributed to the non-explosive nature of these eruptions. After the flood basalts were complete, regional tectonic forces compressed the Columbia Basin from the north and south. These forces resulted in the creation of a series of east-west ridges and valley systems within the Columbia Basin. During this time much tectonic fracturing of the basalts occurred. In addition, as the basalt layers cooled, they produced cooling fractures. The fractures caused both by tectonic forces and by basaltic cooling and shrinking, made the basalt particularly susceptible to the erosive properties of the Ice Age Floods. This basalt erosion is responsible for the dramatic coulees, scablands and other geological features found throughout the flood paths.