Tripoli (microcrystalline chert) has been mined for more than a century in the southern Illinois region. Tripoli deposits reportedly occur almost entirely in the Lower Devonian Clear Creek Chert. Traditional exploration for tripoli deposits has been by sampling and drilling of exposed and near-surface weathered siliceous rocks. In ISGS Circular 555, Berg and Masters (1994) proposed that hydrothermal fluids heated by deep-seated plutonic intrusions were partially responsible for the formation of tripoli deposits—and by inference the implication was that deeper exploration methods should be applied.

A review of the key reasons of Berg and Masters for the inclusion of a hydrothermal component indicates that exploration based on this new hypothesis should not be undertaken without strong consideration of the traditional hypothesis that tripoli deposits formed by a long period of weathering of siliceous rocks. Berg and Masters cited the coincidence of prominent magnetic anomalies with tripoli mining district locations. The highest concentrations of mines and prospects, however, do not correlate well with either magnetic or gravity anomalies and indicate the absence of a relationship between a presumed hydrothermal source (iron-rich intrusive mass) and tripoli occurrences. Berg and Masters’ claim that a discordant leaching surface is not supportive of the near surface weathering hypothesis is flawed conceptually and by poorly defined surfaces. A fluid inclusion analysis indicating quartz precipitation at temperatures ranges near 200°C is in conflict with temperature data based on hydrogen and oxygen isotopic ratios. In addition, there is very little mineralogical data to support the occurrence of hydrothermal deposits.

Characteristics that support the hypothesis that tripoli was formed by a weathering process include (1) the presence of unweathered to weathered transitions in the region, (2) the absence of carbonate material at the surface and in near surface strata in which tripoli formed, (3) the physical appearance of tripoli deposits combined with the absence of carbonate material is typical of the products of a weathering environment, (4) a sandstone overlying the Clear Creek Chert contains fossil molds—suggestive of a near-surface weathering environment, (5) weathering and leaching of carbonate beds resulted in contortion and intrusion of residual clay beds within the Clear Creek Chert, and (6) the irregular areal distribution of the tripoli deposits appears to be typical of an erosional remnant of an older deeply weathered horizon.

To summarize, there is ample evidence that the tripoli deposits are largely the product of a long period of weathering. Evidence for a hydrothermal component is weak, but this possible component should not be completely ruled out without further study.