The planets in our Solar System exhibit a broad range of magnetic fields. Earth and the gas giants have strong, nearly dipolar magnetic fields closely aligned with the rotation axis; the ice giants have magnetic fields that are highly non-dipolar and not aligned with the rotation axis; Mercury has a weak field, not necessarily of dynamo origin; Mars has only the remnants of an extinct dynamo; and Venus has no field. Here we describe steps to understand this range of fields using both numerical modeling and observations. In particular, we outline how some of Tony Dahlen's work with Frederik Simons can be used to glean a little more information from the sparse data.