Figure 10 is interactive and can be activated by clicking on the figure. Click on depth and model to display results. If you are reading the full-text html version of the paper, please view the PDF of this paper or visit <https://doi.org/10.1130/GES02093.10i> to interact with Figure 10.

Figure 10. Tomographic results in map view by starting model (interactive). P-wave perturbations are in left panel, Vp/Vs_{Mean} perturbations are in middle panel, and scaled anisotropy is in the right panel. To interact with figure, first click on figure to activate and then click on depth and model to display results. If you are reading the full-text html version of the paper, please view the PDF of this paper or visit <https://doi.org/10.1130/GES02093.10i> to interact with Figure 10.

models diverge. Vertical smearing effects were observed in our anisotropic checkerboard synthetic tests, so we do not interpret the low anisotropy for the shallowest part of the Isabella anomaly. The descriptions of the Isabella anomalies (IA1–IA3) are summarized in Table 2.

Because the Vp/Vs contrasts suggest that the Isabella anomaly exhibits variations in physical properties, we tested whether the multicomponent Vp/Vs_{Mean} anomaly was an artifact introduced into our model by limited ray coverage or limited resolution (Figs. 11 and 12). First, we tested whether a unimodal, plunging velocity anomaly like that seen in the P-wave tomography could

create two Vp/Vs_{Mean} low anomalies (Fig. 11). Synthetic traveltime data were created from a starting model characterized by a rectangular plunging anomaly with peak Vp/Vs perturbations of –4% and peak P-wave perturbations of 3.7%. This anomaly was placed between 90 and 200 km, plunging 45° to the east. The final results did not reproduce the multifaceted Vp/Vs anomaly seen in our real data. Instead, we recovered a single plunging anomaly with up to 59% of the peak starting Vp/Vs magnitude. Second, we tested whether two Vp/Vs_{Mean} anomalies could create a singular velocity anomaly (Fig. 12). Two Vp/Vs anomalies were given a peak Vp/Vs perturbation of –4%. The shallower anomaly was placed between 50 and 90 km depth, while the deeper anomaly was placed from 160 to 200 km depth. Although we assigned the same magnitude perturbation to both starting anomalies, final inversions revealed that the deeper Vp/Vs anomaly was better recovered, up to 41% of the starting magnitude was recovered at the peak depth. The shallower anomaly only recovered up to 25% of the starting magnitude at its peak depth. Results from this test reveal that if two high-velocity anomalies were separated by slower ambient mantle, we would resolve these two bodies. Neither test reproduced the observed relationship between P- and S-wave velocity and Vp/Vs_{Mean} in our results, indicating that such features are not artifacts. Additional synthetic tests revealed that the Vp-Vp/Vs pattern observed within the Isabella anomaly can arise from a starting model where IA2 is characterized by higher Vp and higher Vp/Vs than IA1 and IA3 (Fig. S2 [footnote 1]). While the spatial distribution of anomalies was not a result of ray geometry artifacts, some signal from a P-wave velocity anomaly might have influenced the Vp/Vs magnitude (Fig. S3).

Mono, Clear Lake, and Coso Anomalies

Our results also contained three high Vp/Vs regions that were all located in areas marked by young volcanism. These locations are the Clear Lake volcanic field, the Coso volcanic field, and the Mono-Inyo magmatic region (Fig. 10I). The Coso Vp/Vs_{Mean} anomaly, located east of the Sierra Nevada near 36°N, was up to 3% higher than average (Fig. 13). This feature corresponds with a zone of low velocities, down to –6% for P waves. While the velocity anomaly was more compact, mainly present above 50 km, the Vp/Vs_{Mean} anomaly extended below 50 km. This Vp/Vs_{Mean} anomaly also exhibited low anisotropy.

TABLE 2. ISABELLA ANOMALIES FROM THE DIFFERENT STARTING MODELS

Starting model	IA1			IA2			IA3		
	dVp (%)	d(Vp/Vs) (%)	Anisotropy (%)	dVp (%)	d(Vp/Vs) (%)	Anisotropy (%)	dVp (%)	d(Vp/Vs) (%)	Anisotropy (%)
IASP	2.83	–0.600	–0.438	5.49	0.249	–1.17	1.41	–1.56	–0.311
Gilbert	5.14	–0.876	–0.389	3.81	0.378	–0.616	0.675	–1.69	–0.135
Moschetti	3.22	–1.21	–0.514	4.52	0.298	–0.553	1.53	–1.61	–0.145
Shen	7.10	–2.21	–0.0938	3.45	0.472	–0.734	0.654	–1.91	–0.398