2016 HAUTE ROUTE DOLOMITES – BY THE NUMBERS

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Introduction

This article is a quantitative analysis of the power data from a participant in the 2016 Haute Route - Dolomites. As well as examining actual event data, it also reviews the rider's training in the four months prior.

The main body of this article is used to present key training and performance metrics and highlight points of interest. The implications of these points and any conclusions or recommendations arising from them are discussed in the final section.

Please note the data presented in this article is from a single athlete and is not intended to act as a default training program. However, it is hoped that it provides a realistic insight into how one rider prepared for, and successfully completed such a challenging event.

About the Data

The data was obtained using a Pioneer (single sided) power meter. It is assumed the power meter was correctly calibrated and accurate throughout. By quoting relative, rather than absolute power figures, it is hoped that the information will be more relevant to riders across a range of abilities.

In preparing this article, a conscious decision was made to use only commonly available software. All data was gleaned from the rider's Strava Premium account and no analytical tools other than Strava and Excel were used.

NB: Alternate training software such as Training Peaks, Garmin Connect and Golden Cheetah, often use slightly different names and algorithms for the metrics mentioned in this article. For example, *Training Stress Score* in Training Peaks and Garmin does not directly equate with *Training Load in Strava*. Hence direct comparisons between the metrics cited here and those in other programs may be unreliable. In such cases, the comparison of ratios or percentages between data sets may be more appropriate.

About the Athlete

Megan Scott is a female master's rider with a running background and approximately three years' riding experience. She has progressed rapidly in the sport of cycling and placed highly in her category for endurance events such as the 2015 Fitz's Challenge and the 2015 and 2016 Peaks Gold Coast Challenge.

Although Megan has limited racing experience, she succeeded in winning the 2016 NSW Masters Women's Road Race and was the 2nd placed female in the 2016 Haute Route Dolomites.

Megan is a busy professional with a demanding full time job. She has no formal coach and no formal training plan. Although I have assisted her on occasion, I would describe her training as largely unstructured. However, she is very dedicated and highly organised. I would consider her attention to nutrition and body maintenance to be the equivalent of an elite level athlete. As well as riding, Megan attends regular yoga classes and also swims twice a week for active recovery.

Megan's Functional Threshold Power (FTP) is 4.13W/kg which is considered excellent*. Her maximum average five minute power is 4.49W/kg (very good*) and her maximum average 1 min power is 7.54W/kg (also excellent*).

*NB: These rating are for a female athlete.

Equipment

Megan has only one bike for training and competition - a Giant Avail which has been professionally fitted by a specialist bike fitter. Her bike is equipped with an Ultegra mechanical 11 speed group set with rim brakes, Fulcrum Racing Zero wheelset and Pioneer (single sided) power meter. Megan trains and competes with a heart rate monitor. She does not have an indoor trainer and completes all of her training on the road.

Gearing in training and for the Haute Route was 50/34T compact crankset with an 11/32T rear cassette. This equates to a gear range of 28.0 to 120.4 inches.

Although not exotic, her equipment is extremely functional and well matched to her size, weight and riding style.

Training History

Megan has been training with power since late 2015, providing nearly a year of power data for analysis. Her use of a single bike is beneficial in terms of collecting consistent data. A review of her *Fitness and Freshness* (using power and heart rate data) during this period shows her fitness peaked at 81 points in February 2016, with minor peaks in the high 70s for key events throughout the year.

Her Strava Fitness and Fatigue for the six months prior to Haute Route can be seen in Graph 1 below.

Graph 1. Six Month Fitness and Fatigue
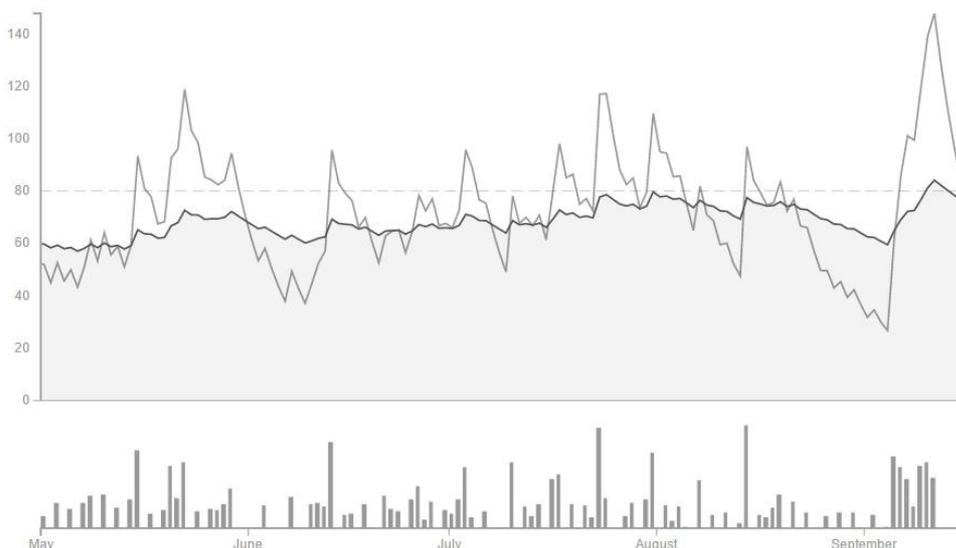
Although Megan did not follow a formal training program, blocks of increased training load (and Fatigue) can be identified in the lead up to targeted events. Evidence of tapering (unloading and a corresponding increase in Form) can also be seen just prior to key events, followed by a short decrease in Fitness before building again.

From a peak of 81 points, Megan's Fitness did not drop below 55 points over the 12 months.

Haute Route Training

Megan's decision to participate in 2016 Haute Route Dolomites was taken relatively late. However, for the purpose of this article, her training for the four months (18 weeks) prior to Haute Route was chosen and examined in detail.

As shown in Graph 2 below, total time on the bike during this period ranged from a minimum of 2 hours per week (due to injury and possibly rain) to a maximum of 17 hours per week. Megan's average weekly training time was just under 10 hours of riding per week.

Graph 2. Training Hours per Week
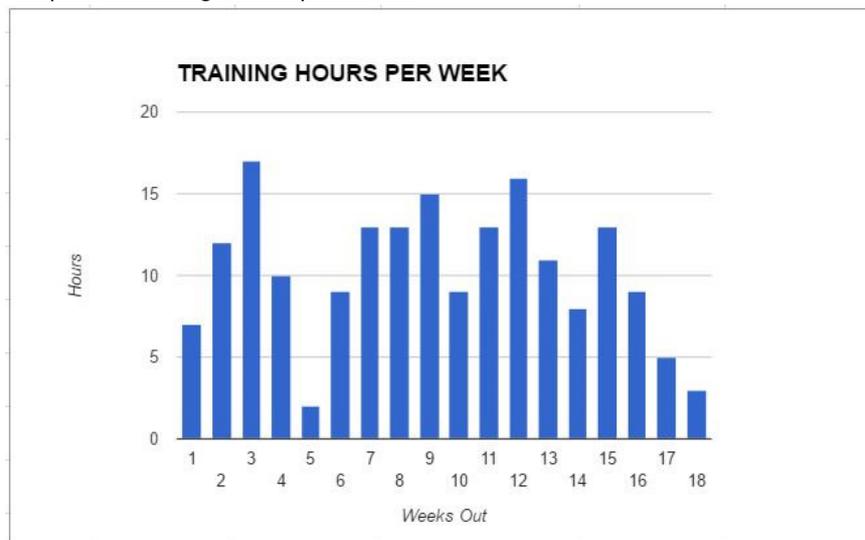
Although duration is one measure of training volume and is useful in terms of time management, it does not reflect her overall Training Load (TL). During this four month period, Megan's TL ranged from a low of 540 points to a maximum of 767 points per week. The majority of weeks averaged a TL of between 80 and 100 points per day, spread over 4 – 6 days cycling.

Table 1 below details Megan's largest training week (by TL) for each of the four months prior to Haute Route. Averages are given for each week based on the actual number of rides as well as for 7 days.

Table1. Largest Training Weeks Per Month By Training Load (TL)

LARGEST TRAINING WEEKS BY TRAINING LOAD								
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Total	Avg / day	Avg / Week
Augst	53	64	18	404			**539**	135	77
July	98	91	42	407	118		**756**	151	108
June	34	102	73	55	116	246	**626**	104	89
May	57	74	250	119	267		**767**	128	110

Obviously climbing is a major component of the event and should be incorporated into an athletes' preparation. Megan's vertical metres in training per week ranged from a low of 2600m to a high of 5300m, with an average of 4200m per week. Total vertical metres per week are detailed in Table 2.

Table 2. Training Vertical Metres per Week

VERT METRES / WEEK							
	Week 1	Week 2	Week 3	Week 4	Week 5	Month Total	Weekly Avg
June	531	3399	5911	5600	6513	21954	4391
July	4003	4849	7135	5100	N/A	21087	5272
Augst	2357	5405	3163	1354	774	13053	2611
May	3022	5818	6350	3303	N/A	18493	4623

Two weeks prior to Haute Route, Megan's Fitness was 77 points with Fatigue level of 97 and a Form of -20. However, an injury unrelated to cycling at this time resulted in plans of a formal taper being abandoned and very little riding was achieved in this final period. This resulted in a drop of Fitness by the start of the event to 59 points (nearly 25%) and a corresponding increase in Form to +33. This decline in Fitness and corresponding decrease in Fatigue can be clearly seen in Graph 1.

Event Analysis

Table 3 below shows the TL and Intensity Factor (IF) for each of the Haute Route Dolomites' seven stages. NB: The IF for each stage below includes the timed and untimed sections. The IF for the major climbs in isolation is provided in Table 5.

TABLE 3. TL and IF by Stage

HAUTE ROUTE STRESS AND INTENSITY			
	DIST (km)	TL	IF	STATED VERT (m)
DAY 1	176	289	0.60	3900
DAY 2	143	245	0.59	3800
DAY 3	103	199	0.62	3200
DAY 4 (ITT)	22	86	0.72	1600
DAY 5	151	251	0.60	3500
DAY 6	169	266	0.59	3600
DAY 7	177	205	0.56	2000
Total	941	1541		21600

Table 3 illustrates two key points. Firstly, aside from the relatively short ITT, all stages were ridden at a very similar intensity (IF). Secondly, the seven stages represent at total Training Load (TL) of 1541 points, *more than twice that of Megan's hardest training week*.

As a comparison, Table 4 below shows Megan's TL and IF for the 2016 Three Peaks and 2016 Peaks Gold Coast events. This indicates that these events were ridden significantly harder than any single stage of the Haute Route Dolomites (excluding the ITT).

Table 4. Peaks Challenge Comparison

3 PEAKS PERFORMANCE COMPARISON			
	DIST (km)	TL	IF	VERT (m)
3P FC 2016	236	379	0.64	4497
3P GC 2016	230	404	0.69	4514

The higher intensity and TL of the Peaks' events can be accounted for by the fact that they are single day events. In comparison, it is the cumulative TL of repeated stages and its impact on Form that is critical in a multi-stage event.

For this reason during our general discussions, it was agreed that Megan needed to ride conservatively during the initial stages, otherwise the resulting cumulative fatigue may result in a drastic decline in performance in the second half of the week.

To help quantify this intensity level, Megan reviewed her power data from the Peaks' events and made a conscious decision to ride below her average power for the major climbs such as Mt Hotham and Falls Creek. Megan's IF for the major climbs of each stage of Haute Route are shown below in Table 5. The tight range in IF illustrates Megan's use of her power meter to climb within this specific power range.

Table 5. Climbing Intensity by Stage

HAUTE ROUTE CLIMBING INTENSITY (IF) - MAJOR CLIMBS				
	Climb 1	Climb 2	Climb 3	Climb 4
Stage 1	0.73	0.70	0.65	0.64
Stage 2	0.64	0.69		
Stage 3	0.64			
Stage 4 (ITT)	0.72			
Stage 5	0.62	0.72	0.69	
Stage 6	0.66	0.64		
Stage 7	0.70			

A review of Megan's cadence for the above climbs revealed a minimum average of 71 rpm (Climb 1, Stage 2) and a maximum average of 92 rpm (Climb 3, Stage 1), with a mean of and median of 80 rpm. NB As stated earlier, Megan was using a 50/34T compact crankset with an 11-32T rear cassette.

Another perspective on the demands of the event can be seen by examining the overall time spent in each power zone as shown below in Graph 3.

Graph 3. Percent of Overall Time by Power Zones
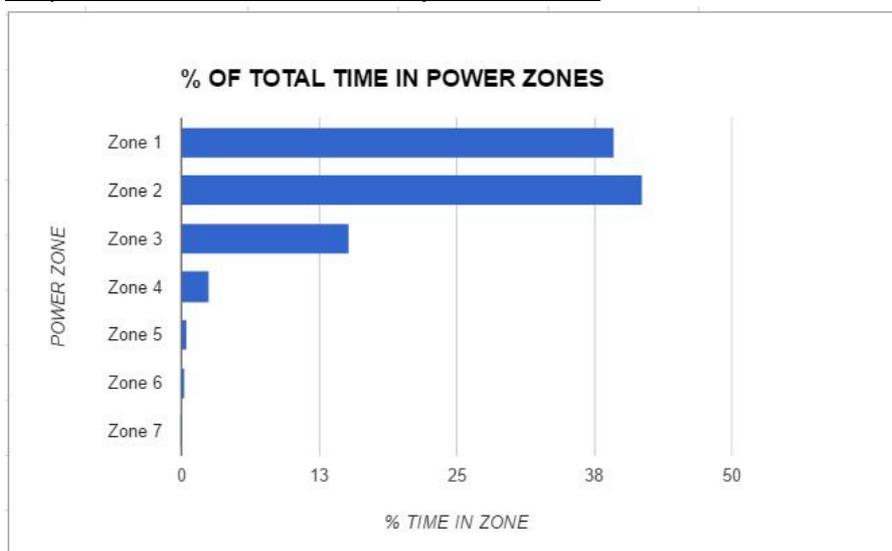
It can be seen that the vast majority of Megan's time was spent in Power Zones 1 and 2. Overall, 81% of her time was spent below 75% of her FTP. This figure is skewed somewhat by the large amounts of descending and untimed sections where she rode easily. However, it is significant that only 4% of Megan's time was spent at or above threshold. Given her total riding time for the event was 43:45:00, 4% represents 01:45:00 for the week. Conversely, 57% of Megan's time was spent in Zones 2 – 3, or 25 hours over 7 days.

This intensity may appear surprisingly low, however the sheer volume of riding involved throughout the week meant that even at this low intensity, the TL and associated cumulative Fatigue was very high.

The effect of the daily TL can be seen below in Graph 4. Despite Megan's Form commencing at 33 points, by Stage 2 she had already declined into negative values as the high TL of over 200 points per stage accumulated. It can be seen that Megan's Form steadies slightly on Stage 4 due to the short ITT, before plunging into uncharted territory over the final stages.

Graph 4. Event Fitness v Form
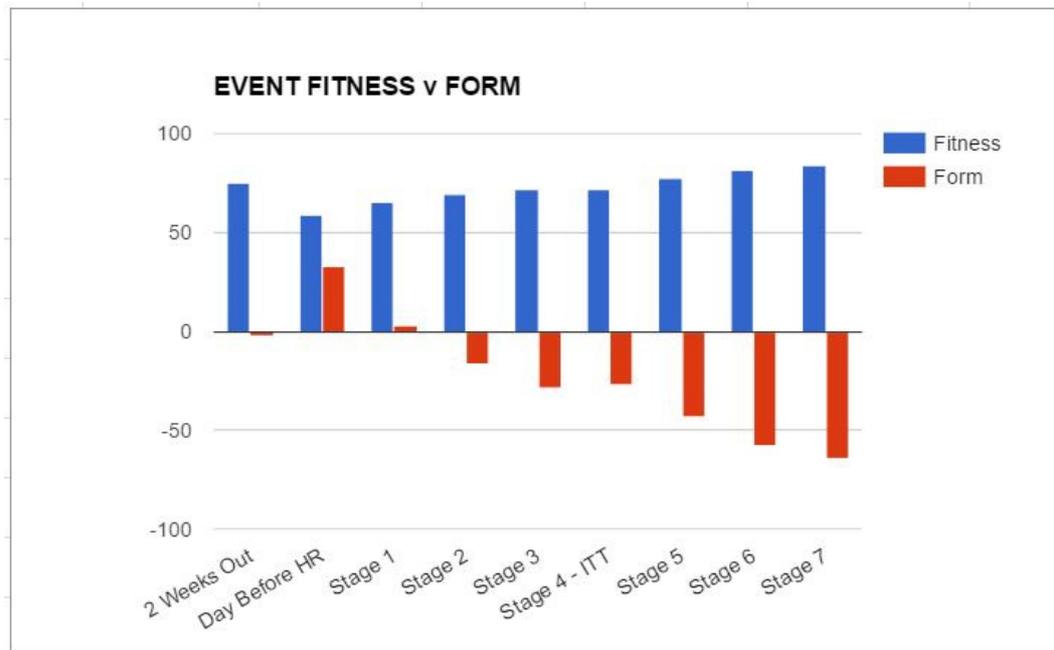
To put these Fatigue values in perspective, depending on the individual's capacity to tolerate training load, I would rarely hold an athlete's Form below - 25 (Strava) points for an extended period. Most amateur riders can cope (i.e. train effectively without illness or injury) with a Form level of around -10 to -20 while building fitness, before eventually being unloaded.

Conclusions

It is important to remember that the above information comes from a single rider and therefore should be applied with caution. However, I believe it does have value as a true reflection of the realities of training and participating in a Haute Route event.

1. The Value of Reliable Data

This analysis would not be possible without reliable data. Hopefully it illustrates the value in capturing consistent information. It can be seen that the use of a power meter allows a degree of analysis that is not possible using other measures such as heart rate alone.

I believe the most important metrics that power provides are TL or TSS, IF and the ability to quantify Fitness, Fatigue and Form. That is not to say that effective training can't be undertaken without a power meter. However, accurate recording of information that includes quantifying training intensity and load (not just volume) is invaluable.

2. Training Volume

Despite Megan training for an average of 10 hours per week and a maximum of 17 hours, the Haute Route Dolomites represented a Training Load of more than double her hardest training week. This implies that for amateur riders with full time work and family commitments, it is all but impossible to fully replicate the demands of the Haute Route. However, some reassurance can be taken from the fact that Megan successfully completed the event on an average of 10 hours training per week in the 16 weeks leading up to the event. This is not an unrealistic training volume for most amateur riders.

3. Make Room

To complete the necessary training you will need to create the room in your life to do so. I use the term "room" because time is only one factor. In addition to being organised and time savvy, your training will be much easier with the support and understanding of those around you. Keep perspective, try to maintain a healthy life balance and show your appreciation to those who may not fully understand your need to cycle up mountains on the other side of the world, but love you anyway.

4. Consistency Counts

Megan's training was relatively consistent throughout the previous 12 months. Often, when reviewing the training history of a rider who is new to coaching, I see large inconsistencies where Fitness peaks around key events but is then followed by significant drops in training and a subsequent decline in Fitness which then needs to be rebuilt.

Placing a premium on health and avoiding illness also allows consistent training to take place. This is closely linked to factors such as diet, sleep and recovery practices.

Incorporating intermediate goals throughout a season can greatly help maintain motivation and consistency. Importantly, maintaining a reasonable level of fitness allows intensity to be increased gradually, while keeping fatigue in check.

In short, the less fit you are the sooner you need to start training and the more gradually you need to build.

5. FTP Matters

Although over 80% of Megan's time during Haute Route was spent at or below 75% of her FTP, I believe there is still the need to incorporate training targeted specifically at increasing FTP.

A higher FTP shifts up the ranges of the power zones below. This allows the athlete to either ride at a higher wattage for the same IF and TL or at the same wattage for a lower IF and TL.

As an example, two riders may finish a stage with the same time. However, the rider with a higher FTP will have done so at a lower intensity (IF) and hence carry a lower level of Fatigue into the following day. Continue this process over a several days and it can be seen how the performance of a rider with a lower FTP can fall away.

6. Don't Ignore Your VO2

Given that FTP is always a percentage of VO2, ignoring training above Power Zone 4 can lead to a false FTP ceiling. Importantly, VO2 is negatively impacted by altitude (approx. 10% for every 1000m above 1500m) and it is likely that a Haute Route rider will be working at higher intensities at higher altitudes. Having a higher VO2 can help offset some of the impact of altitude.

Although still considered very good, Megan's 5 minute maximum average power was below the level of her other markers. This tends to indicate an underdevelopment of her VO2 and is not uncommon with athletes who focus on endurance riding. Had I been formally coaching Megan, I would have incorporated periods focused on improving her critical power between 2 and 5 minutes as well as her FTP.

7. Build a Solid Base

Megan spent 57% (25 hours) of Haute Route Dolomites in Power Zones 2 - 3. Although low in intensity, this still represents a significant Training Load because of the sheer volume. Her total time in Zone 2 (18 hours) was greater than the entire time of her biggest training week.

From the data, it obvious that aerobic endurance plays a major role in the event. Therefore, significant training volume should be completed in these zones. Importantly, longer efforts in Power Zone 3 have shown to have a positive effect on FTP with less perceived stress.

Increasing 1 – 2+ hour maximum average power should be a primary goal of any Haute Route rider. This means including long, *easy* rides as a corner stone of your training. This is not unlike the traditional early season base training undertaken by professional riders.

Importantly, athletes with well-developed aerobic endurance have been shown to recover more quickly between repeats of high intensity intervals. Bottom line, you need to be able to keep on keeping on and you will also obtain more from your VO2 work if you have first established a good aerobic base.

8. Start Conservatively

Prior to the event, the accumulation of fatigue was a key point of discussion between Megan and myself. I repeatedly reminded her of the importance of riding the initial stages conservatively, especially on Stage 1 where adrenalin and enthusiasm would make it very easy to ride too hard. However, having a plan and executing it are two different things. Megan displayed great discipline and awareness and deserves full credit for sticking to her plan.

9. Practice Back to Back Hard Rides

The capacity to cope with fatigue varies greatly between individuals. As stated, in reality it is impossible to replicate the demands of the event. However, stringing back to back hard days will allow you to gain a little insight into how you cope. And it is not just about the doing the kms. An extended weekend tour or training camp may highlight areas that need to be addressed such as bike fit, equipment, organisation/packing, nutrition, recovery routines etc and allow you to make positive adjustments that will benefit you come event time.

10. Practice Your Taper

I hope the information above highlights that Fitness does carry a Fatigue cost. In a multi-day event, cumulative fatigue will erode performance, even if it is carefully managed. Starting an event like Haute Route in a fatigued state will only accelerate this decline.

Megan's injury two weeks prior to the start of Haute Route was challenging, both physically and mentally. However, it did provide a forced lay off that saw her Form improve dramatically. Unfortunately, being unable to ride made it impossible to obtain feedback regarding any improvement (perceived or otherwise) in her performance.

The corresponding drop in Fitness (nearly 25%) over this time was significantly greater that what I would aim for under a controlled taper. Ideally I would have manipulated her Training Load to reach a Freshness figure of around +25 with a corresponding drop in fitness of no more than 10%.

As a coach, I am willing to favour Freshness over Fitness in the final preparation for multi day event. Given the extreme Fatigue levels in the latter part of the event, the forced lay off and additional increase in Form may have been a blessing in disguise. We will never know.

As well as assisting motivation, B priority events can also be used to experiment with different tapers. The results can then be assessed to design the most effective methodology for the individual athlete and then applied to key events. It is an oversimplification, but if you felt great and performed well previously with your Form at +20, chances are you will perform well at +20 in the future.

However, in the most simple terms I would simply encourage any rider to aim to be at the start line as fit and as healthy as they can be, with a positive attitude and good energy. A little nervous excitement is good, it means you have energy to spare.

11. Enjoy!

For many riders, an event like Haute Route is an experience of a life time. Despite this article's emphasis on data, cycling cannot be described in numbers alone. I encourage riders on a long program to include at least one unstructured ride per week. This may be a club ride or a regular group ride that they really enjoy. Take your Garmin and put it in your pocket occasionally, do your favourite ride and remind yourself of why you love riding your bike.

Acknowledgement

I would like to thank Megan Scott for giving me access to her data and for generously allowing this information to be shared.

Congratulations on a fantastic effort.

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